User Needs Study

Land-related Information Systems

Provincial Report

1983

Ontario

Ministry of
Natural
Resources

Hon. Alan W. Pope
Minister

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Deputy Minister

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1 INTRODUCTION TO PROVINCIAL USER NEEDS STUDY

BACKGROUND

In 1974, the Ministry of Natural Resources was given the responsibility to develop a comprehensive system which would permit the rapid and visual geographic correlation of the physical properties, legal status, resources and use of the lands in Ontario. To date, several standards and components of the comprehensive system are in place, others are under development. The Ministry has established provincial horizontal control survey standards and guidelines, a provincial horizontal control survey data bank, a horizontal control survey adjustment, analyses and network design program, as well as programs for plotting control survey networks and converting co-ordinate values from one system to another. In addition, the Universal Transverse Mercator Grid System has been adopted as the official provincial geographical referencing grid. A systematic series of grid cells structured on the UTM has been designed for those who reference their data to grid cells. The Ontario Basic Mapping System is yet another component to the comprehensive system.

Maps are fundamental to almost all land-related information systems. Some information systems, in fact, are structured on digital maps. The Ministry is aware of the growing use of digital maps in North America and keeps abreast of the capabilities of the more promising digital mapping systems. It has even developed a pilot system to determine firsthand what can and cannot be done with this technology.

In order to understand the overall provincial picture, the Ministry of Natural Resources also had to study municipal agencies and examine data flows between these agencies and provincial ministries.

PROBLEM DEFINITION

In approaching the questions associated with provincial land-related systems, several key issues had to be resolved.

- There was no clear understanding of the overall provincial needs for land-related data.
- There was no clear understanding of how provincial agencies would use a provincial digital topographic data base.
- There was no clearly defined approach to facilitate the exchange of land-related data between the province and municipalities.
- There was a lack of clearly defined direction for the implementation of digital mapping systems at the provincial and municipal levels in view of the plethora of available technologies with limited and varied capabilities.

To resolve these issues, the province proposed to:

1) hold a seminar on land-related information systems in order to inform both municipal and provincal representatives of the capabilities of current digital mapping and land-related information technologies used in other jurisdictions;

2) invite municipal participation in an intergovernmental user needs study;

3) identify through this study all land-related information sources in the provincial and municipal domains of interest;

4) identify municipal and provincial systems which would affect the design of a province-wide digital topographic data base;

5) identify the generic tools required to implement and manage land-related data;

6) develop a conceptual model showing the provincial land-related data bases and their dependencies;

7) develop a functional model which identifies the transactions that occur within the data bases and the effect each transaction has on each of the data bases;

8) develop a conceptual model showing the provincial data bases and their relationship to a digital topographic data base;

9) develop a functional model for the province showing the relationships between the different provincial data bases.

To implement these proposals, the province developed a plan to carry out a user needs study in those departments involved with land-related information, in the provincial government and in several representative municipalities. It was also proposed that Ministry of Natural Resources staff, in co-ordination with private consultants, primarily from the survey and mapping industries, conduct this study under the auspices of the Surveyor General's Office.

The important task of designing the conceptual and functional models for use by municipalities and the province as guidelines for system implementation was proposed to be delegated to a Technical Advisory Committee reporting to the project manager.

PROJECT APPROACH

The provincial agencies that were analysed in the User Needs Study were selected by asking the members of the Interministerial Committee on Geographical Referencing to submit names of all departments and sections in their ministry that use land-related data. The following agencies were analysed in the User Needs Study: Ministry of Agriculture and Food, Ministry of Citizenship and Culture, Chief Election Officer, Ministry of Consumer and

Commercial Relations, Ministry of the Environment, Ministry of Government Services, Ministry of Health, Ministry of Municipal Affairs and Housing, Ministry of Natural Resources, Ministry of Revenue, Ministry of Tourism and Recreation, Ministry of Transportation and Communications, Ontario Provincial Police, Bell Canada, Ontario Hydro, and Union Gas.

A team of interviewers to gather study data were selected, familiarized with the intent, background and focus of work, and trained for project activities. Two-person teams conducted the interviews. Approximately 85 interviews were conducted.

Through the interviews, information was collected on the following:

- Organization and Responsibilities

  (Primary functions performed by the agency or unit being studied, including organizational context and relevant background.)

- Tasks/Systems

  (Key tasks employing or developing land-related information, performed in carrying out the organization's responsibilities, and the manual and/or automated systems currently used or proposed for use in these tasks.)

- Data Sources

  (Descriptions of the land-related data items developed and used by the organizations, including existing formats, display media, extent of data coverage, size of files, frequency of use, data accuracy and resolution, storage and access method, as well as data management procedures and positional references used.)

- Observations

  (General findings regarding the organization, its functions, data uses, needs and problems experienced with respect to accessing, using, manipulating, referencing and otherwise handling land-related data.)

- Future Needs and Wants

  (Functions not now automated but desired to be automated, as well as any other needs stated by the agency representatives interviewed.)

- G.I.S. Potential

  (Identification of applications for which there was a need for automated generic functions and the potential of any application area interviewed to become involved in a pilot project which could further advance the development of land-related information systems which would be of benefit to both themselves and others.)

For ease of recording, analysing and comparing the findings from the provincial interview, a format was prepared and reporting forms were designed for subsequent completion by the interview teams. The Provincial User Needs Study Report documents the findings regarding these interviews and all of the information gathered.

Other types of forms used for summary analysis conducted included a correlation analysis (prepared in matrix form) of provincial tasks and the data types required. Matrices were also prepared to summarize data sources and to document provincial map and tabular data types and sources.

These materials were prepared for use in building the conceptual and functional models for provincial data base design. The functional model of a provincial system will isolate and clarify the data components or entities which operate in a provincial context, and how these components interrelate to facilitate provincial operations.

A conceptual model and a functional model were developed based upon the information derived from the User Needs Study.

GENERAL OBSERVATIONS

The User Needs Study did not attempt to address all of the potential computer system needs of the provincial agencies studied. Rather, it consistently focused upon the provincial needs for systems to handle, store, manipulate and produce land-related information. Some other needs and wants identified by agency representatives are mentioned in the report although these have not been explored in detail.

2 MINISTRY OF AGRICULTURE AND FOOD

2.1 OVERVIEW

The goal of the Ministry of Agriculture and Food is to encourage the efficient and dynamic development of the agriculture and food sector for the well-being of all residents of Ontario. The Ministry's programs include marketing, quality standards, foodland preservation and improvement, education and research, advisory and technical services to farmers, as well as farm financial assistance.

The Ministry is organized into three major sections, each headed by an assistant deputy minister. The sections are:

- **Marketing and Development** which is responsible for the Marketing, Quality and Standards, and Foodland Preservation and Improvements Divisions;
- **Technology and Field Services** which is responsible for the Education and Research, and Advisory and Technical Services Divisions; and
- **Finance and Policy** which is responsible for planning, policy development and farm assistance programs.

The organizational structure is illustrated in **Figure 2.1-A** which follows.

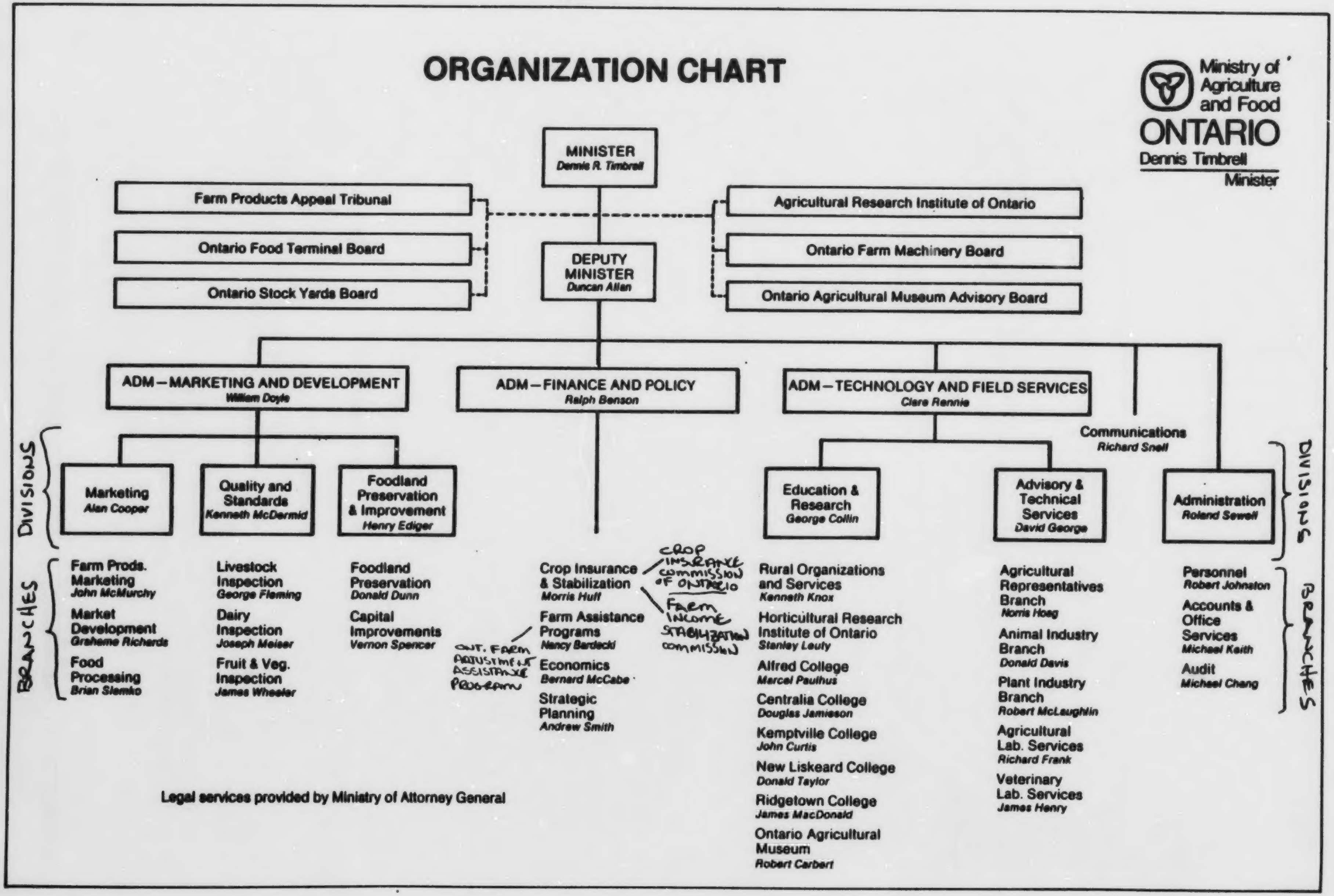
The Marketing Division comprised of the Farm Products Marketing, Market Development and Food Processing Branches is responsible for:

1. supervising activities of producer marketing boards and adjudicating producer-processor disputes,
2. increasing consumer awareness and appreciation of Ontario-grown and processed foods, through Foodland Ontario,
3. providing support for export sales missions, and
4. encouraging expansion and diversification of Ontario's food processing industry.

Through its various branches, including the Fruit and Vegetable Inspection, Livestock Inspection and Milk Industry Branches, the Quality and Standards Division is responsible for:

1. inspecting and licensing livestock and poultry processing plants as well as milk production and processing facilities, and
2. inspecting and grading fresh and processed fruits and vegetables.

Figure 2.1-A


ORGANIZATION CHART
Ministry of Agriculture and Food
ONTARIO
Dennis Timbrell
Minister
MINISTER
Dennis R. Timbrell
DEPUTY MINISTER
Duncan Allan
Farm Products Appeal Tribunal
Ontario Food Terminal Board
Ontario Stock Yards Board
Agricultural Research Institute of Ontario
Ontario Farm Machinery Board
Ontario Agricultural Museum Advisory Board
ADM – MARKETING AND DEVELOPMENT
William Doyle
ADM – FINANCE AND POLICY
Ralph Benson
ADM – TECHNOLOGY AND FIELD SERVICES
Clare Rennie
Communications
Richard Snell
DIVISIONS
Marketing
Alan Cooper
Quality and Standards
Kenneth McDermid
Foodland Preservation & Improvement
Henry Ediger
Education & Research
George Collin
Advisory & Technical Services
David George
Administration
Roland Sewell
DIVISIONS
BRANCHES
Farm Prods. Marketing
John McMurchy
Market Development
Graheme Richards
Food Processing
Brian Slemko
Livestock Inspection
George Fleming
Dairy Inspection
Joseph Meiser
Fruit & Veg. Inspection
James Wheeler
Foodland Preservation
Donald Dunn
Capital Improvements
Vernon Spencer
Crop Insurance & Stabilization
Morris Huff
Farm Assistance Programs
Nancy Bardecki
Economics
Bernard McCabe
Strategic Planning
Andrew Smith
CROP INSURANCE COMMISSION OF ONTARIO
FARM INCOME STABILIZATION COMMISSION
ONT. FARM ADJUSTMENT ASSISTANCE PROGRAM
Rural Organizations and Services
Kenneth Knox
Horticultural Research Institute of Ontario
Stanley Leuty
Alfred College
Marcel Paulhus
Centralia College
Douglas Jamieson
Kemptville College
John Curtis
New Liskeard College
Donald Taylor
Ridgetown College
James MacDonald
Ontario Agricultural Museum
Robert Carbert
Agricultural Representatives Branch
Norris Hoag
Animal Industry Branch
Donald Davis
Plant Industry Branch
Robert McLaughlin
Agricultural Lab. Services
Richard Frank
Veterinary Lab. Services
James Henry
Personnel
Robert Johnston
Accounts & Office Services
Michael Keith
Audit
Michael Chang
BRANCHES
Legal services provided by Ministry of Attorney General

The Foodland Preservation and Capital Improvements Branches in the Foodland Preservation and Development Division carry out mandates which include:

1. preserving agriculture lands for future generations, and
2. increasing productivity of land through land clearing, tile drainage and farmstead improvements.

The Education and Research Division, through the Rural Organizations and Services, Horticultural Research Institute of Ontario (HRIO) and Ontario Agricultural Museum Branches, as well as a number of agricultural colleges, is responsible for:

1. carrying out research to improve agricultural productivity and food product quality under priorities determined under HRIO,
2. operating five regional colleges of agriculture to equip Ontarians for careers in farming, agri-business and food processing, and providing courses for rural adults,
3. providing leadership to the rural community through such programs as 4H Clubs, Junior Farmers and Women's Institutes, and
4. encouraging urban citizens to gain a wider appreciation of the contributions made to society by rural Ontarians.

The responsibilities of the Advisory and Technical Services Division are carried out through its five branches, specifically, the Agricultural Representatives, Animal Industry, Plant Industry, Agricultural Laboratory Services and Veterinary Laboratory Services Branches. These responsibilities involve:

1. providing counselling in farm management to assist producers in maintaining financially viable operations,
2. counselling producers and farm supply businesses on new methods and techniques and assisting them in developing more productive operations, and
3. operating and managing laboratory services for the analysis of soil, feed and other organic materials, and providing animal diagnostic services to farmers and veterinarians.

The Finance and Policy Division is composed of the Crop Insurance and Stabilization, Farm Assistance Programs, Economics and Strategic Planning Branches. Its responsibilities include:

1. developing, administering and assessing all financial programs designed to assist producers,

2. assisting senior management in analysing issues and assigning priorities, and

3. carrying out program analysis and research for agricultural policy.

2.2 FINANCE AND POLICY DIVISION

2.2.1 CROP INSURANCE AND STABILIZATION BRANCH CROP INSURANCE COMMISSION OF ONTARIO

2.2.1.1 CROP INSURANCE PROGRAM

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of this Unit is to offer crop insurance on demand for farmers in Ontario. At present, 46 crops are covered as well as approximately 20,000 farmers out of an eligible total of 70,000 farmers in Ontario. There are approximately 32,000 policies in force with a total liability in excess of $500 million. The Crop Insurance Program replaced a number of ad hoc programs which served farmers once needs were demonstrated. For example, drought payments for Eastern Ontario in 1966 were determined only after damage had been done, and it was deemed necessary to provide assistance to farmers.

The Crop Insurance Program is a program shared with the federal government. The actual administration is carried out by the Ontario government which also bears the administrative cost. At present, a farmer's premium is augmented by an equal amount from the federal government. Insurance coverage ranges from 65% to 80% of the insured individual's average farm yield.

Administratively, the organization consists of head office as well as six local area managers. Each local area manager is supported by a number of agents who work on a commission basis.

TASKS/SYSTEMS

1. Handle Applications for Coverage

A local agent is responsible for writing coverage for each farmer who wishes to participate in the program. The information maintained on the application form consists of: location of the home farm (e.g., county, township, concession, lot); the number of acres of the property; the number of acres that one intends to plant; type of crop; ownership of land or rental; and other data.

The application must be submitted with a deposit of $1 per acre for which coverage is desired. The application is then submitted to the area manager to examine the application form for consistency. It is often necessary to do field validation when the information appears to be inconsistent.

In the case of renewals, a computer printout is available on an annual basis, which shows yields, price options chosen, acreage, and so on for each insured farmer for the previous year. Any changes are recorded on the application form, which is then submitted to the area manager.

The Crop Insurance Programs are administered annually.

2. Processing at Head Office

The information is sent by the area manager to head office in Toronto, where it is then "keyed to disc" for entry into the Queen's Park Computer Centre. At the same time, funds are credited to the individual farm accounts. A final acreage report is then generated. It shows such information as farmer's name, address of the home property, area, agent, crop and price options selected. This report is then sent back to the field office, so that when final planting is done, all relevant details can be entered.

When underwriting, a variety of supporting information is available to head office and the field offices. For example, there are recorded details for the area as well as relevant information about soil types, drainage, and so forth. From this, the implied yield can be determined for various parcels.

When the information is updated in the field, the report is returned to head office along with a cheque for the balance of the outstanding coverage.

3. Handling Claims

There are various levels of claims available from this program. Firstly, there is an unseeded acreage benefit which offers the insured a level of coverage if planting was not successfully completed. There is a fixed amount for "reseeding" which is payable depending on the acreage, the crop and the level of coverage.

Normally, the claim information is submitted at the time that yearly yield information is collected. This must be done within ten days after the harvest.

OBSERVATIONS

Information maintained on existing computer files contains components which are confidential and, therefore, not available for general distribution. Some of the information is used in statistically aggregated formats for transmission to Statistics Canada and for use in other special studies.

At present, there is no mechanism for relating insurance coverage to specific parcels. The policy is tied to the farmer and only the address of the home property is known. No information is available on specific parcels that are being farmed by the particular farmer, which may extend beyond the address of the home farm. This can be particularly misleading when the property that is being farmed is rented and when the rental properties change from year to year.

The Section runs a computer program which gives simulated yields for a hay crop. As input variables, this program uses weather data as well as some local information such as soil type to determine the potential yields. This program can only operate in small areas. However, it does give reasonable information for these specific localities.

FUTURE NEEDS AND WANTS

The Section would benefit from access to better programs for simulating yields for all crops. At present, the process of establishing insurance coverage relies, to a great extent, on the judgment of the area managers. The availability of remotely sensed data which correlates with land parcels would be useful for this purpose. Soils and ownership maps would also be desirable. It would be desirable to further automate this process so as to provide a better means of establishing and limiting the liability in underwriting insurance policies.

There is clearly a need for a parcel base system which can be used to relate all information associated with specific crops and their yields. There is also a need to relate parcels with a specific farmer as a management aid in ascertaining the liability coverage. A parcel base system would also provide a vehicle for recording and maintaining historical crop information for each farm and field within each farm.

G.I.S. POTENTIAL

There is clearly a G.I.S. potential for having a parcel base system to which relevant crop information can be associated. Specifically, it is important to keep historial information about specific fields and farms as a means of providing better administrative control for the Crop Insurance Program. This information could also be of value to other agencies within the provincial government and more specifically within the administration of the Ministry of Agriculture and Food.

Even though very few of the G.I.S. functions are performed now, it is clear that a G.I.S. would provide an enhanced capability in terms of polygon overlay, point in polygon, query/window, cosmetic enhancement, graphic superimposition, polygon mapping and text annotation, as a means of assisting in staff functions. For example, it is desirable to have a means of correlating the yields for specific farms with the yields of other farms within the same locality. Much of the G.I.S. potential would evolve over time as the Ministry of Agriculture and Food data base is created and maintained.

DATA SOURCE INFORMATION SHEET

TITLE: Crop Insurance File

SOURCE AGENCY: Crop Insurance Program

PERSON: Doug Jackson

TITLE: Field Service Manager

ADDRESS: 801 Bay Street
5th Floor
Toronto, Ontario

PHONE: (416) 965-7661

DESCRIPTION: file of insurance policies for specific crops

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 32,000 policies

GROWTH RATE: has fluctuated (both increasing and decreasing over time)

DATA ITEMS: contract number, type of crop, yield, insured's address (county, township, lot, concession), agency number and name, insured's phone number, adjusters name and phone number, tile drainage, type of coverage

RETRIEVAL KEY(S): enrollment number (contract number), program number index related name, enrollment number and phone number

GEOCODE: county, township, lot, concession

DATE OF CREATION:

FREQUENCY OF UPDATE: once a year

COVERAGE/COMPLETENESS: Ontario farming areas

SOURCE OF INFORMATION: application form
field checks

USERS OF INFORMATION: STATSCAN, other interested members of the public for specialized studies

VOLUME/FREQUENCY OF USE: May-November high volume and frequency of use

ACCESS METHOD FOR USER: reports, limited access to on-line query

AVAILABILITY: limited due to confidential information

CHARGES: none

HARDWARE AND LOCATION: Queen's Park Computer Centre, IBM 3270's

SOFTWARE: VSAM files, batch processing input

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: CROP INSURANCE PROGRAM

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Handle Applications								
	For Crop Insurance								
	Coverage		●	●	●				
2	Head Office Application								
	Processing								
3	Handling Claims		●	●				●	●

AGENCY FUNCTIONS		CARTOGRAPHIC DATA						
		GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Handle Applications							
	For Crop Insurance							
	Coverage							
2	Head Office Application							
	Processing							
3	Handling Claims							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA — MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Handle Applications														
	For Crop Insurance														
	Coverage														
2	Head Office Application														
	Processing	□			□										
3	Handling Claims														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA — MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Handle Applications														
	For Crop Insurance														
	Coverage														
2	Head Office Application														
	Processing													●	●
3	Handling Claims														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA — DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Handle Applications										
	For Crop Insurance										
	Coverage										
2	Head Office Application										
	Processing	□			□	□	□				□
3	Handling Claims										

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Handle Applications													
	For Crop Insurance													
	Coverage													
2	Head Office Application													
	Processing													
3	Handling Claims													

2.2.1.2 FARM INCOME STABILIZATION COMMISSION OF ONTARIO

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of this Unit is to administer Income Stabilization Programs for five commodities, namely, corn, barley, wheat, soybeans and white beans, as well as the sow/weaners program. The purpose of these programs is to support farmers in times of low market prices for these commodities. There are 3,200 pork producers enrolled in the sow/weaners program. For the cereal commodities 6,558 producers were enrolled in 1982.

The Stabilization Program provides support for farmers when the price of the commodities falls below 90% of federally set commodity floor values over a five-year period. The Ontario government program is provided, in addition to the federal program, to offer extra support of up to 95% of the commodity floor value.

TASKS/SYSTEMS

1. Administer Stabilization Programs

Using existing mailing lists and advertising in farming journals, the Unit sends application forms to farmers for enrollment into these Stabilization Programs. Each application form has a number of parameters which are: the number of tons expected to be sold in the following year for each crop, crop type, name of applicant, mailing address and location of applicant by county, township, concession, and lot.

The Stabilization Program fee is based on a shared formula, and involves federal and provincial funding, namely, 5% of the value (1/3 paid by the applicants and 2/3 paid by the province). This money goes into a separate account for each farmer and crop. If there are no stabilization payouts in the three-year period covered by the program, the money is returned to the applicant with interest.

OBSERVATIONS

The existing system is open to abuse because there is currently no cross-referencing capability. It is difficult to monitor a person who submits applications to and receives support from various stabilization programs.

FUTURE NEEDS AND WANTS

A parcel based system which could relate farm crop inventories to specific parcels and report on their status, would be of benefit to this Unit in monitoring its Stabilization Programs. Such an inventory would include information on the type of crop and animals associated with each parcel. Information on current land uses as well as cropping history would provide an informative perspective related to the Unit's ongoing activities.

G.I.S. POTENTIAL

The Unit would benefit from a spatial and attribute query capability in order to retrieve and validate information on the application forms, and to correlate this information with known resources for the parcel. The program information could be of value to other agencies within the Ministry of Agriculture and Food for planning functions.

DATA SOURCE INFORMATION SHEET

TITLE: Farm Income Stabilization Program

SOURCE AGENCY: Ministry of Agriculture & Food
PERSON: Barbara Hunter
TITLE: Program Administrator
ADDRESS: 801 Bay Street
Toronto, Ontario
M7A 2B2

PHONE: (416) 965-1811

DESCRIPTION: an inventory of all those participating in the program

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: N/A

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: approximately 10,000 enrolled

GROWTH RATE: stable

DATA ITEMS: number of tons of crop expected to be sold, crop type, name of applicant, mailing address, location of applicant by county, township, concession and lot

RETRIEVAL KEY(S): name of applicant

GEOCODE: county, township, concession and lot

DATE OF CREATION:

FREQUENCY OF UPDATE: one a year

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: application forms

USERS OF INFORMATION: internal to Stabilization Program Administrators

VOLUME/FREQUENCY OF USE: as applications are made to the program

ACCESS METHOD FOR USER: terminal

AVAILABILITY: limited

CHARGES: none

HARDWARE AND LOCATION: IBM 3270s, Queen's Park Computer Centre

SOFTWARE: VSAM files, batch processing input

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Agricultural
Stabilization
Programs

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

			TABULAR DATA								CARTOGRAPHIC DATA																																												IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIO-GRAPHIC DATA			REFERENCE TO DATA TYPES
											GENERATION						STORAGE	MANIPULATION / ANALYSIS																												DISPLAY																						
																		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Administer	○	◐		◐				◐																																	□	□																							
		stabilization programs																																																																

2.2.2 ECONOMICS BRANCH
STATISTICS SECTION

ORGANIZATION AND RESPONSIBILITIES

The Statistics Section of the Economics Branch is responsible for the orderly collection, organization and publication of agricultural statistics. In performing this mandate it also undertakes a variety of surveys which are published at regular intervals.

Much of the information which is reported statistically is based on the census and agricultural data derived from Statistics Canada Census on agriculture conducted every five years. The province is responsible for maintaining this data for Ontario. Since the census is conducted every five years, it is necessary for the province to conduct surveys on some regular cycle in order to fill in and update the survey data. The surveys are also carried out for specialized projects, activities and crops.

The emphasis of this Section is now shifting to meet data needs for policy development rather than the traditional role which was to present reports on historical economic trends and statistical information. The perspective has changed to one of forecasting and problem comprehension based on existing information.

The Section is also responsible for the development of economic information systems necessary for carrying out its mandate. The Branch has an ongoing responsibility for monitoring and analysing all issues which pertain to agriculture; therefore, it looks at the interprovincial, national and international perspectives and considers their application to Ontario agriculture.

TASKS/SYSTEMS

1. Maintaining Census Statistics on Ontario Agriculture

The Statistics Section collects, organizes and publishes agricultural statistics in general publications as well as a variety of surveys and releases. Much of the information is tabulated by county from which district, regional or provincial level information can be derived on demand. Reporting is based primarily on the census on agricultural data, which is conducted every five years.

There are an estimated 80,000 farmers in Ontario with a total agricultural acreage of approximately 16.5 million acres. The information recorded is in terms of 52 counties covering 580 townships. Statistics Canada aggregates information at the township level, whereas provincial information is aggregated on the county level for presentation. Four levels of aggregation are possible at the county, region, district and provincial levels.

The collected data is used to establish a data base for use by the Ministry and associated agencies. The information is used for reporting, analysis and interpretation as well as forecasting. A complete list of the publications, surveys and special publications is shown in the Appendix.

2. Conducting Agriculture Surveys

A major source of information for the Statistics Section is a variety of agriculture surveys which are conducted on a regular basis. Approximately 80 to 90 surveys are conducted per year, and this activity occupies approximately 60% of the time for the Section. The surveys are conducted by mail, with a mailing list derived from the Central Farm Register. The Central Farm Register, in turn, is compiled from the Statistics Canada Census which is updated continuously. Statistics Canada assigns each farm a unique identification number based on the township and a sequential number within the township. This number is lost if the farmer should transfer properties or die.

In conducting surveys, a sample list of names is generated from the Central Farm Register. Some of the surveys are essentially stand-alone and as such are used for reporting purposes. Other surveys rely on the maintenance of historical information. For these, a match is made between the survey and information stored within existing files.

Ten to twelve major surveys are conducted each year. The information from these surveys is entered into the system by means of "keyed to disc" function when done within the government services. In some cases, the information is prepared externally and the information is entered by a "keyed to tape" operation. In both cases, the data ultimately is compiled and maintained at the Queen's Park Computer Centre. The presentation of information is through SPSS.

The Section also conducts a number of very specialized surveys such as the tender fruit survey. In this survey an inventory of approximately 90% to 95% of the commercial fruit growers is maintained. This survey is unique in that it records positional information down to the concession and lot number. The list of participants for this survey is derived from the Ministry of Agriculure and Food representatives. There are similar surveys for other specialized crops.

In addition, the Section conducts a number of price surveys, normally on a monthly basis. This information is entered into the Section's local Hewlett-Packard 3000 mini-computer. This involves the entry of approximately 200 forms each month.

3. Consultation

Because of the extensive experience in conducting surveys, this Section acts in an advisory capacity to other branches of the Ministry for survey methodology. In this role it assists other branches and agencies in various aspects of conducting surveys, including form design, distribution, data processing, presentation, etc.

4. Preparation of Special Reports

As this Section shifts to a somewhat different mandate in which forecast and estimation is a primary consideration, the Section is undertaking a variety of special projects and providing support for policy formulation. In this capacity, it collects information and presents it to policy makers as required. This function supports the new direction being taken in the Branch.

5. General Inquiry

The Section provides a variety of inquiry services to the farm industry. The information is available either through telephone or over-the-counter service, as well as through reports and special printouts. There is no charge for this service.

System Environment

The computing environment for this Section is based on the use of the Queen's Park Computer Centre. Also, the information is stored in archival format. The Section uses a variety of statistical packages such as SAS and SPSS for a number of reports which are prepared on demand.

The Statistics Section also has access to outside computing resources including I.P. Sharp. This service is used to obtain information from the Statistics Canada Simulation Package (CANSIM) for current statistical information. CANSIM is maintained by Statistics Canada. The I.P. Sharp system is also used for its mailbox facility. Other outside resources include Dataline System, which is used for running specific programs such as the objective yield survey.

The Section also has its own HP 3000 for maintaining survey data. This information is archived monthly. For the long term storage, information is archived in Cooksville.

Data that are maintained are stored in sequential files. There are approximately 10,000 to 20,000 records on the cropland inventory survey. Many of the other files contain a few thousand records.

OBSERVATIONS

This Section makes limited use of land-related information. Little use is made of maps since, at this time, it is impossible to establish a relationship between the farmer ID and the individual parcel. In the role of a statistical agency, the Section is not concerned with specific parcels but rather with the aggregation of information at the county level. This involves some work since Statistics Canada data are on the township level.

Some problems are associated with the present form of operation. For example, if a farm changes hands it is no longer possible to do a match between current survey data and past data. Consequently, in the long run this affects the sample size.

The Statistics Section maintains a very important data base, and as such is a supplier of data to other agencies and organizations, including the Department of Treasury and Economics, universities, and others. The use of the data has changed over a period of time and this change is likely to continue. There is clearly a great potential for developing an MIS system capability using the base data. This would be very valuable in terms of providing both management information service functions as well as a decision support system for policy formulation.

There are a number of other problems associated with the transfer of information from the Statistics Canada file. In Northern Ontario, Statistics Canada aggregates many of the townships alphabetically rather than by location. This limits the value of the information and its potential for affecting correlations due to a mismatch of administrative areas.

At this time, there is limited correlation of information even within the Ministry, simply because of the lack of common standards and location of information. This problem is being addressed by the Data Policy Committee, which is working towards a set of standards for the sharing of agricultural information.

FUTURE NEEDS AND WANTS

Even though the Statistics Section appears to be a self-contained entity, it is clear that it could benefit from a number of improved services. Specifically, there is some need for spatial query which would allow correlation of various levels of information as soon as it becomes available. For example, it would be appropriate to correlate the distribution of county elevators with the storage capacities in the county. This type of function could not be performed manually; to perform this type of function, it would be necessary to have better access to location information.

There is a need for an efficient system for obtaining crop area statistics, including the status of various crop areas. In time, this could be achieved through the use of some form of remote sensing capability in conjunction with improved base maps for recording this information.

The Section needs to have on-line access to a variety of data bases. At present, most of the information is available through a variety of batch runs using existing packages. On-line access incorporated with a modelling capability would be of great benefit to this Section, particularly for decision making and policy formulation.

There is also a need for more extensive information within the existing data base in order to extend its usefulness and potential. For example, in many cases it is desirable to have some form of location identifier for all farms. This would be most useful in a variety of statistical aggregation functions.

The Section also has the need for a general ability to correlate statistics with the land base. For example, it would be desirable to correlate the major agricultural systems with a land inventory. A parcel data base with farm identifiers would be most beneficial in this regard.

G.I.S. POTENTIAL

There is clearly a potential for using a G.I.S. capability within the Statistics Section. A generalized geographical information system would provide necessary resources for correlating spatially distributed information for agriculture. Some of these functions are available through packages like SAS. However, a generalized capability would provide for extensive modelling which could be used in policy formulation.

Even though maps are not used at this time, the historical approach to the presentation of agricultural information would likely be changed if locational information was associated with the data. Spatial depiction of specific problem areas that are linked to statistics would be most valuable for policy formulation.

For maintaining census statistics, a broad variety of software procedures are envisioned as potentially useful for this Section. These include various types of geometric analyses, query capabilities, cartographic composition and presentation tools, and procedures for handling and producing text, business graphics and bibliographics.

Policy formulation would also benefit from these types of tools, as well as those for handling image data. There is clearly a longer term potential in the ability to correlate imagery data from remote sensing with the land base. Such applications would clearly improve the timeliness of the information maintained in the data base.

DATA SOURCE INFORMATION SHEET

TITLE: CENSUS OF AGRICULTURE

SOURCE AGENCY: Statistics Section

PERSON: Nick Roller

TITLE: Senior Statistician

ADDRESS:
Economics Branch
Ontario Ministry of
Agriculture & Food

PHONE:

DESCRIPTION: A subset of Statistics Canada national agriculture census carried out every 5 years

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	mag. tape
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: census tract

SIZE/VOLUME: 80,000 farms in Ontario

GROWTH RATE: N/A

DATA ITEMS:
- Location at Township Level
- 550 agriculture variables

RETRIEVAL KEY(S):
- township
- country
- district, region

GEOCODE: township

DATE OF CREATION: 1981

FREQUENCY OF UPDATE: monthly surveys by Economics Branch of OMAF

COVERAGE/COMPLETENESS:
52 Counties of Ontario

SOURCE OF INFORMATION:
Statistics Canada 5 year census tape together with monthly surveys

USERS OF INFORMATION:
Economics Branch and agricultural industry indirectly through OMAF

VOLUME/FREQUENCY OF USE:
daily
possibly 1 per day

ACCESS METHOD FOR USER:
- computer output
- telephone inquiries

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION:
Queen's Park Computing Centre

SOFTWARE:
S.P.S.S.

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: AGRICULTURAL SURVEYS

SOURCE AGENCY: Statistics Section
PERSON: Nick Roller
TITLE: Senior Statistician
ADDRESS: Economics Branch
Ontario Ministry of
Agriculture & Food

PHONE:

DESCRIPTION: 80 to 90 agricultural surveys per year are conducted by the Statistics Section of the Economics Branch for a variety of standard as well as project oriented surveys

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	x	x	mag. tape/paper
IMAGE			
TEXT			
LIBRARY			

NOTE: n/a

SCALE:

ACCURACY/RESOLUTION: generally aggregated at county, district and regional

SIZE/VOLUME: 10 to 12 categories of surveys conducted at various intervals in a year

GROWTH RATE: N/A

DATA ITEMS:
Agricultural variables with location to county, district, provincial level

RETRIEVAL KEY(S):
- agricultural variables such as crop types
- county, district

GEOCODE: county and district

DATE OF CREATION: montnly and yearly

FREQUENCY OF UPDATE:
upon completion of survey

COVERAGE/COMPLETENESS:
Ontario

SOURCE OF INFORMATION:
returned survey forms from surveys

USERS OF INFORMATION:
- Hydro
- municipal planners
- financial institutes
- Economics Branch of OMAF

VOLUME/FREQUENCY OF USE:
monthly to produce reports

ACCESS METHOD FOR USER:
- publications

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: - monthly prices survey on H.P. 3000 at OMAF
- other data on Queen's Park computer

SOFTWARE:
SPSS plus special programs developed inhouse

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

Statistics Section
Economics Branch
Ministry of Agriculture
and Food
801 Bay Street
Toronto, Ontario

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA							
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1 Maintaining census of Agriculture for Ontari	○	●	●	●	●	●	☐	●
2 Conducting Agriculture surveys	○	●		●	●	●		●
3 Policy Formulation					●	●	●	●

AGENCY FUNCTIONS	CARTOGRAPHIC DATA						
	GENERATION						STORAGE
	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Maintaining census of Agriculture for Ontari							
2 Conducting Agriculture surveys							
3 Policy Formulation							

AGENCY FUNCTIONS	CARTOGRAPHIC DATA: MANIPULATION / ANALYSIS													
	GEOMETRIC ANALYSIS													
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Maintaining census of Agriculture for Ontari	☐		☐				☐		☐		☐	☐		☐
2 Conducting Agriculture surveys														
3 Policy Formulation	☐		☐				☐							

AGENCY FUNCTIONS	CARTOGRAPHIC DATA: MANIPULATION / ANALYSIS													
	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Maintaining census of Agriculture for Ontari													☐	☐
2 Conducting Agriculture surveys														
3 Policy Formulation													☐	☐

AGENCY FUNCTIONS	CARTOGRAPHIC DATA: DISPLAY									
	COMPOSITION					PRESENTATION				
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Maintaining census of Agriculture for Ontari	☐				☐	☐				☐
2 Conducting Agriculture surveys										
3 Policy Formulation		☐			☐	☐				☐

AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA			BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL		ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	Chloroplethic Mapping
1 Maintaining census of Agriculture for Ontari				☐	☐	☐	☐		☐	☐	☐	☐	☐	☐
2 Conducting Agriculture surveys														
3 Policy Formulation	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	

2.2.3 STRATEGIC PLANNING BRANCH DATA POLICY COMMITTEE UNIT

ORGANIZATION AND RESPONSIBILITIES

The Data Policy Committee was recently established to examine various aspects of data collection, data use and data requirements within the Ministry. Its perspective is to establish a long term objective for data handling within the Ministry of Agriculture and Food (AGF).

TASKS/SYSTEMS

1. Design AGF On-Line Data Base

At this time, the data Policy Committee is considering the design and implementation of an on-line data base for the Ministry of Agriculture and Food. At present, AGF data is structured on a file system basis. However, it is anticipated that an integrated data base will be created for managing and maintaining all AGF data. This would provide on-line access to all data associated with farm properties and establish a correlation between properties and farmers.

There are 158,000 farm properties within Ontario as classified by the Assessment Services Division of the Ontario Ministry of Revenue. Of these 80,000 are classified within the census category "farm" (farms with a revenue of greater than $250 per year). From this classification and Ministry application programs such as farm income and crop insurance, it is expected to develop a total inventory of 50,000 to 60,000 farmers by name for use in developing an agricultural data base.

A number of steps have been taken to build a data base. Firstly, a data dictionary has been compiled from questionnaires sent to all sections and units within the Ministry of Agriculture and Food and revenue assessment data as shown in Figure 2.2.3-A. From this a complete list of data items (see the Appendix) is available.

The model 204 data base management system has been chosen for subsequent implementation. Some work has been carried out to date in prototyping the system in which the various data items are integrated, for example, ownership data with the farmer's name, etc. The specific keys are the assessment roll number, as well as the enrollment number (one enrollment number per farmer) assigned by the Ministry of Agriculture and Food.

In building the data base, it has been decided to incorporate new programs first and subsequently incorporate other major programs such as the farm tax rebates, crop insurance, beef programs, etc.

A fundamental design criterion has been that each manager would be responsible for his own data. There will be restrictive access to certain fields storing confidential data, but general access will be provided to the remaining parts of the data base. At present, Model 204 DBMS provides several

Figure 2.2.3-A

OMAF - Information Capture Survey (ICS)

Section B

This section is designed to summarize the types of information being collected to support your programs and activities.

The following form should be used to report what items data is being collected on and what information is being collected. Examples are:

Item: Farmer Information Collected: Name
Address
Telephone No.
Crops
Acreage
.
.
.

Item: Farm Information Collected: Farm No.
Farm Owner
Farm Address
Acreage
.
.
.

Item: Company Information Collected: Enrollment No.
Company Name
Company Address
Main Product
Price List
.
.
.

Additionally, it is necessary to know how the item is uniquely identified. In the above examples, the unique identifiers for the three items would be Name, Farm No. and Enrollment No.

For those with computerized systems, the information collected on an item would correspond to the associated field names.

Finally, please attach a copy of all data collection forms used (i.e. application forms, recording forms, etc.) and any computer file layouts.

Thank you for your co-operation.

.....Continued

levels of security.

It is anticipated that this data base will be implemented in one to five years.

OBSERVATIONS

Since the Ministry of Agriculture and Food is concerned with the development of a comprehensive data base for agricultural data, it would be appropriate, at this time, to establish a working relationship with MNR to assist in developing the spatial components of the data base. This would be of great benefit to both AGF and MNR for facilitating common access to the spatial components of shared data bases.

G.I.S. POTENTIAL

Clearly, there is a spatial component to the AGF data base. However, even though the primary motivation for the AGF data base is the maintenance of inventories, there is a generalized potential for planning and management of resources which relies on spatial data processing techniques such as polygon overlay, etc.

2.3 FOODLAND PRESERVATION AND IMPROVEMENT DIVISION

2.3.1 CAPITAL IMPROVEMENTS BRANCH

2.3.1.1 AGRICULTURAL RESOURCE INVENTORY

ORGANIZATION AND RESPONSIBILITIES

The primary objective of this Branch is to create and maintain an agricultural resource inventory for Ontario, which has two major components:

1. an inventory of the cropping system, and
2. an inventory of the tile drainage system.

At this time, the provision of an inventory is mainly an administrative function which relies on external agencies to provide the relevant data.

TASKS/SYSTEMS

1. Create Inventories

The inventory was started by a federal agency, the Land Resource Research Institute, primarily for a project in Eastern Ontario. This institute developed a methodology for the mapping of crop rotations, which is now used by the province.

In this methodology, aerial photographs at a scale of 1:50 000 and 1:40 000 (where available) are used for deriving planimetric data. The agricultural fields are identified on the aerial photographs and subsequently validated by field survey. The Section encodes field survey data by symbolizing crop types on a Mylar overlay. Ownership information is then obtained from the assessment office to define management units.

Each management unit is evaluated as to the crop mix and crop percentage to identify an agricultural system (rotation). These systems include a mono culture system, corn, mixed, hay, pasture, grazing and cash crop grain systems. For adjoining parcels of similar cropping systems, the common lines are dissolved to form crop system polygons. The crop system polygons are superimposed on the 1:50 000 scale NTS map series. The 1:50 000 scale NTS maps have been manually joined together to form township maps. Currently, there are approximately 400 to 500 of these township maps.

Very little effort has been directed toward updating the crop data since the inventory is relatively new. However, it is anticipated that updating will be done in one of three ways:

1. Spot checks by agriculture staff in the field.

2. Conducting an audit of 200 4,000 acre sites.

3. Using Landsat IV imagery data.

A major user of this inventory is Ontaro Hydro for route and site selection. To this end, data has been digitized by Ontario Hydro for route selection study projects. Another pilot project is being conducted at the University of Guelph to examine the potential of using Landsat data for updating the existing inventory. Use has also been made of this inventory by Environment Canada to identify areas that are prone to soil erosion.

Another component of the inventory addresses tile drainage. This provides an inventory of the location and the extent of tile drainage currently in place. The procedure used in developing the inventory is to examine lists of farmers who have borrowed money for installing tiles. A field visit to the farm determines where tiles have been installed. Other farms in the neighbourhood are also visited (this has been necessary as some farmers have installed tiles without the need to borrow money).

The information is represented on base maps made available from MTC on a township basis. These maps are photo adjusted to a scale of 1:25 000 and must be redrawn in order to show the road allowance to scale. There are approximately 1,100 maps for land use and tile drainage. Some of these maps have also been digitized by Ontario Hydro in a pilot project.

At present, the drainage maps are being updated from information provided by drainage contractors. Each contractor must be licensed and in turn must provide information for each new tile project currently undertaken. This information contains details such as location, year, number of areas involved, outlets, etc. The maps are redrawn based on map needs.

It should be noted that the drainage maps show the network of municipal or outlet drains. These are of potential use to Conservation Authorities for their water management plans. There are approximately 5,000 projects per year for a total value of $65 million.

The Section employs a coding system for townships which is based on the Statistics Canada coding system. Information about the township is recorded in terms of a township code. In the case where the township has been replaced by a region, the code reflects the previous township code. This coding system allows access to the geographic township entity and thus a base to identify lot and concession.

OBSERVATION

The Agricultural Resource Inventory reflects current agricultural status, in contrast to the CLI and OLI data which reflect potential capability.

Much of the data has been assembled from a number of make-work projects during the past five years. These projects have gathered data for specific areas, addressing land uses and drainage data, and producing maps for certain areas.

A pilot project is currently under way using video recording. This is based on flying at approximately 6,000 feet along concession lines. Land use information can be derived for all properties between two concession lines. This is designed to provide rapid information gathering for updating purposes.

FUTURE NEEDS AND WANTS

There is clearly a desire to encode the basic Agriculture Resource Inventory data in digital format. This would be useful and meaningful for integration with other digital processing capabilities at the Ministry of Agriculture and Food and in the administration of many of their agricultural programs.

G.I.S. POTENTIAL

Much of the present activity in this Section is G.I.S. oriented. With a proper G.I.S. system, the Section would be able to more effectively carry out its mandate by relating information to a parcel base as well as recording many of the details associated with each parcel such as crop type, and the presence of tile drainage. Much of the processing is currently done manually, such as polygon overlay, which could be expedited through a generalized polygon overlay capability. Polygon dissolve, now done manually, is a natural G.I.S. function in terms of creating the polygons which show the aggregated cropping systems. Point in polygon in conjunction with polygon overlay could be used for determining the number of a certain type of cropping system within a given area. There is also a need to perform such calculations as area and perimeter calculations in the preparation of agricultural planning and status reports.

It is anticipated, in time, to be able to correlate imagery with the existing agricultural inventory. This would clearly expedite the processing and updating of the current inventory.

There is clearly a requirement and a potential for providing generalized access to the data base for both spatial and attribute query. This would facilitate the day-to-day operations for the Ministry as well as providing information for developing new programs for specific regions.

The presentation of inventory findings would also be facilitated if automated G.I.S. capabilities, including polygon and point mapping with text annotation were to become available.

DATA SOURCE INFORMATION SHEET

TITLE: Agriculture Resource Inventory

SOURCE AGENCY: Ministry of Agriculture & Food
PERSON: George Jackson, Program Manager
TITLE: Capital Improvements Branch
ADDRESS: 801 Bay Street, 8th floor
Queen's Park
Toronto, Ontario
M7A 2B2
PHONE: (416) 965-7661

DESCRIPTION: an inventory of cropland system categories in Ontario

FORMAT:

	M	A	MEDIA
MAP	x		
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE: from composite township map derived NTS map series
SCALE: 1:50 000

ACCURACY/RESOLUTION: schematic accuracy

SIZE/VOLUME: 400 - 500 maps

GROWTH RATE: 0

DATA ITEMS: crop system classification (symbolized) polygons (road network), drainage as a location reference only

RETRIEVAL KEY(S): township, lot, concession

GEOCODE: township

DATE OF CREATION: 1978 - 1983

FREQUENCY OF UPDATE: unknown

COVERAGE/COMPLETENESS: agriculture areas of Ontario

SOURCE OF INFORMATION:
- aerial photographs
- field validation

USERS OF INFORMATION:
- Ontario Hydro
- internal use within Agriculture and Food
- research agencies

VOLUME/FREQUENCY OF USE: 20 maps distributed per week

ACCESS METHOD FOR USER: phone or over-the-counter queries

AVAILABILITY: open

CHARGES: none for 6 maps or less, reproduction costs for 6 maps or more

HARDWARE AND LOCATION: file at 801 Bay Street, Toronto, Ontario

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: Tile Drainage Inventory

SOURCE AGENCY: Ministry of Agriculture & Food
PERSON: George Jackson, Program Manager
TITLE: Capital Improvements Branch
ADDRESS: 801 Bay Street, 8th floor
Queen's Park
Toronto, Ontario
M7A 2B2
PHONE: (416) 965-7661

DESCRIPTION: an inventory of farmland drainage systems

FORMAT:

	M	A	MEDIA
MAP	x		
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE: composite township map derived from MTC township maps
SCALE: 1:25 000

ACCURACY/RESOLUTION: schematic accuracy

SIZE/VOLUME: 500 - 600 maps

GROWTH RATE: 0

DATA ITEMS: lot, drainage network and municipal drains, drainage features, e.g., sites, records

RETRIEVAL KEY(S): township

GEOCODE: county, township

DATE OF CREATION: 1979 - 1983

FREQUENCY OF UPDATE: 400 drainage installations per month

COVERAGE/COMPLETENESS: agricultural land in Ontario

SOURCE OF INFORMATION:
- existing list of borrowers for drainage projects
- field validation
- contractors

USERS OF INFORMATION:
- Ontario Hydro
- internal to Agriculture and Food
- research projects

VOLUME/FREQUENCY OF USE: 10s of maps per week

ACCESS METHOD FOR USER: over-the-counter enquiries

AVAILABILITY: open

CHARGES: none for 6 maps or less, reproduction costs for 6 maps or more

HARDWARE AND LOCATION: file at 801 Bay Street, Toronto, Ontario

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: AGRICULTURE RESOURCE AND DRAINAGE INVENTORY

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Creating inventories	○	◐	◐	◐				◐

AGENCY FUNCTIONS		CARTOGRAPHIC DATA						
		GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Creating inventories		◐		◐	◐		◐

AGENCY FUNCTIONS		CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS – GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Creating inventories	◐		◐	◐			◐				◐			

AGENCY FUNCTIONS		CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS											
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING								
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING
1	Creating inventories												

AGENCY FUNCTIONS		CARTOGRAPHIC DATA											
		MANIPULATION / ANALYSIS		DISPLAY									
		QUERY		COMPOSITION					PRESENTATION				
		SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Creating inventories	◐	◐	◐				◐	◐		◐		◐

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Creating inventories		○	○										

2.3.1.2 NORTHERN ONTARIO RURAL DEVELOPMENT AGREEMENT (NORDA) DRAINAGE PROGRAM

ORGANIZATION AND RESPONSIBILITIES

The Capital Improvements Branch has the responsiblity of administering several programs, the goals of which are to increase productivity of land through:

1. water management, including municipal and tile drainage;
2. programs designed to increase and improve the productive land base; and
3. programs to better describe the land base and use.

A staff of 30 administer these programs, of which some are cost-shared by the federal government. One of the programs is the Northern Ontario Rural Development Agreement (NORDA), which encourages the development of farmland in Northern Ontario. A similar program exists for the eastern portion of the province.

Presently, the NORDA program is being utilized by approximately 800 farms.

The Capital Improvements Branch has a number of other programs which direct money to specific locations within the province for capital assistance to farmers. In all, there are approximately six of these programs, including the Apple Tree Replacement Program, the Seasonal Housing Assistance Program and the Farm Enlargement Program.

TASKS/SYSTEMS

1. Administer NORDA Program

The NORDA program provides an opportunity to the farmer to clear new farmland. The NORDA grant covers 50% of land clearing costs, up to a maximum of $10,000 per farm. In regard to the tile drainage portion of the program, the grant covers 20% of the total cost, to a maximum of $5,000 per farm. Should the farm make an application for both of these grants, then the NORDA program covers up to $10,000 cost for a combined application for land clearing and tile drainage development. A third aspect of the NORDA program encompasses a grant for erosion control. This includes the construction of surface ditches and contouring of the land to promote drainage and inhibit land erosion. Although this is a minor portion of the NORDA program, it covers 40% of the cost up to $5,000 for erosion control on farms.

2. Administer Drainage Programs

The Drainage Program has an annual budget of $38 million and is administered for the most part at the municipal level. The two components of this program are the on-farm tile drainage systems and the outlet drainage systems of the municipalities.

The municipal outlet drainage systems are administered by the municipalities themselves, which includes the initial construction of the system and its subsequent maintenance. The Capital Improvements Branch provides to these municipalities a valuable grant to aid in the construction and maintenance of these drainage systems.

Although this program is one that is carried out at the municipal level, the Capital Improvements Branch is still interested in maintaining records concerning this program. Specifically, the Branch keeps a record of where the drains are located, by filing the engineering drawings made for the construction of the drains and transferring this information onto drainage maps maintained by the Capital Improvements Branch.

The on-farm tile drainage system component of this program is administered at the municipal level. The farmer prepares an application which identifies the particular parcel, namely, the township, lot and concession number. This application for the loan is either accepted or rejected at the municipal level.

The municipality obtains the money for this loan program by selling debentures to the Capital Improvements Branch. In return, the Capital Improvements Branch obtains information on which properties are involved in the loan program. The Capital Improvements Branch places the debenture information in an automated filing system which includes other data, such as the particular parcels in question, the tile types, length of sizes utilized by the various successful applicants.

It should be noted that inspection of the sites eligible for tile drainage is carried out by the municipality.

OBSERVATIONS

At present, each application for the NORDA and other assistance programs requires a legal description of the parcel in question, namely, the township, concession and lot number. The computer is utilized to maintain an automated file which consists of a file number, the approval and financial status of each project to date and the name and address of the applicant. The computer system which is used to maintain this automated file makes use of a statistical program for the approval process and to monitor the usage of the grants by the successful applicants.

One of the problems encountered by this Branch is that there is no cross-referencing mechanism between the various programs. In this regard, for a particular area, several applications can be made to a number of assistance programs by one farmer and this Branch does not have a convenient means to monitor these applications. Only through a manual process can the Branch currently determine how many individual assistance programs apply to a particular parcel of land.

Map information of the drainage systems administered by the municipal governments is currently received by the Capital Improvements Branch in a variety of formats, such as 1:10 000 and 1:5 000 scale engineering-type maps. This information is then transferred to the drainage maps maintained by the Branch. Due to the number of map scales utilized, there may be a loss in accuracy in the production of the drainage maps since no standard format is utilized.

FUTURE NEEDS AND WANTS

The NORDA program would like to develop several capabilities in the near future. One of these would be to integrate the data from the various assistance programs in order to enable the Branch to know at any one time how many programs are being used by a particular farm. In order to facilitate this, it is desired to have a unique parcel identifier included with the application for the particular parcel in question, as well as the name and address of the applicants themselves. Finally, it is felt that the provision of some mapping would enhance the monitoring process.

There is a desire on the part of the Capital Improvements Branch to standardize the information received so that more accurate drainage maps can be produced and maintained by the Branch. It is felt that the availability of an automated mapping system would provide a common base that would facilitate the mapping and correlation of soils and information on vegetation, among other data items. This would help the municipalities and the Capital Improvements Branch in assessing the various applications to their programs.

G.I.S. POTENTIAL

The Capital Improvements Branch appears to require a sophisticated filing and indexing system for NORDA in order to monitor and cross-reference its various farm assistance programs. G.I.S. capabilities do not appear necessary for these responsibilities.

The availability of an automated mapping base may enhance the services of the Capital Improvements Branch in regard to the outlet drainage systems program for municipalities, namely, the maintenance of drainage map with greater accuracy. It is felt that the availability of this information, as well as the farm tile drainage system information, on an automated base, with the ability to overlay other data, such as soils and vegetation, may also be of use here and to other areas within the Ministry. Other types of analysis and retrieval functions which would be desirable include point in polygon, windowing, proximal analysis, area/perimeter calculations, queries, and polygon and line mapping with annotation of text.

DATA SOURCE INFORMATION SHEET

TITLE: Tile Drainage

SOURCE AGENCY: Capital Improvements Branch
PERSON: Mr. V. Spencer
TITLE: Director Capital Improvements
ADDRESS: 801 Bay Street, 8th Floor
Toronto, Ontario
M7A 2B2

PHONE: (416) 965-7661

DESCRIPTION: an automated and manual file for maintaining applications for tile drainage loans

FORMAT:

	M	A	MEDIA
MAP	x		paper
TABULAR			
IMAGE			
TEXT	x	x	applications
LIBRARY			

NOTE:

SCALE: ubknown 1:25,000 or
1:50,000

ACCURACY/RESOLUTION:

SIZE/VOLUME: approximately 20,000

GROWTH RATE: 3,592 per year

DATA ITEMS: *detail on drainage system including size and length of pipe, acreage, cost
- amount of loan
- location identifier in terms of lot and concession, township
- applicant name

RETRIEVAL KEY(S): an applicant has
- a sequential identifier number
- applicant name

GEOCODE: program started in 1800s

DATE OF CREATION: bi-monthly

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS: entire Province

SOURCE OF INFORMATION: applicant provides information via the municipality in which farm is located

USERS OF INFORMATION:
- Capital Improvements Branch
- OMAF in general and public through aggregated summary publications

VOLUME/FREQUENCY OF USE: daily

ACCESS METHOD FOR USER:
- maps showing application areas
- summary documents
- manual files
- computer

AVAILABILITY: aggregated data if opening available

CHARGES: maps - cost of production

HARDWARE AND LOCATION: manual files - OMAF offices
- Queen's Park mainframe

SOFTWARE: unknown

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
summary data on applications is maintained on computer

Other Assistance Programs are in various stages of automation.

DATA SOURCE INFORMATION SHEET

TITLE: Northern Ontario Rural Development Agreement (NORDA)

SOURCE AGENCY: Capital Improvements Branch

PERSON: Mr. V. Spencer

TITLE: Director Capital Improvements

ADDRESS: 801 Bay Street, 8th Floor
Toronto, Ontario
M7A 2B2

PHONE: (416) 965-7661

DESCRIPTION: a manual application and records file. Also an automated file which contains selected application data for financial analysis in the budgeting process. The NORDA program encourages farmland development in Northern Ontario

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	disk
IMAGE			
TEXT	x		applications
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: approximately 800

GROWTH RATE: approximately 300 per year

DATA ITEMS:
- location identification, township, lot, concession
- applicant name and address
- costs involved
- aggregated data by districts

RETRIEVAL KEY(S): name and address

GEOCODE: N/A

DATE OF CREATION: 1981

FREQUENCY OF UPDATE: continuous

COVERAGE/COMPLETENESS: Northern Ontario

SOURCE OF INFORMATION: individual applications

USERS OF INFORMATION:
- Capital Improvements Branch
- senior government levels in provincial and federal government

VOLUME/FREQUENCY OF USE: continuous

ACCESS METHOD FOR USER:
through manual files at OMAF offices or through automated summary file system

AVAILABILITY: restricted

CHARGES: N/A

HARDWARE AND LOCATION: small in-house computer

SOFTWARE: unknown

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
other programs for assistance are in various stages of automation

DATA SOURCE INFORMATION SHEET

TITLE: Municipal Drainage Data under Drainage Act

SOURCE AGENCY: Capital Improvements Branch
PERSON: Mr. V. Spencer
TITLE: Director Capital Improvements
ADDRESS: 801 Bay Street, 8th Floor
Toronto, Ontario
M7A 2B2

PHONE: (416) 965-7661

DESCRIPTION: a manual file containing applications for grants by municipalities for drainage and detailed information on the Drainage Project

FORMAT:

	M	A	MEDIA
MAP	x		paper
TABULAR	x		summary
IMAGE			
TEXT	x		applications
LIBRARY			

NOTE:

SCALE: various for engineering plans and small scale to identify municipalities

ACCURACY/RESOLUTION:

SIZE/VOLUME: 500 to 600 per year

GROWTH RATE: 500 to 600 per year

DATA ITEMS:
- breakdown of costs for construction
- engineering details
- identification of municipality
- breakdown of assessment of costs to landowners

RETRIEVAL KEY(S):
- municipality name
- drain name within municipality
- the year of grant

GEOCODE: not yet

DATE OF CREATION: late 1800s

FREQUENCY OF UPDATE: on a yearly basis

COVERAGE/COMPLETENESS: entire Province

SOURCE OF INFORMATION: municipality through staff and municipal engineering consultants

USERS OF INFORMATION:
- Capital Works Branch
- OMAF
- other ministries and municipalities

VOLUME/FREQUENCY OF USE: daily

ACCESS METHOD FOR USER: through summary documents that are published
- manual files
- maps identifying municipalities

AVAILABILITY: open

CHARGES: none, except for map reproduction

HARDWARE AND LOCATION: manual file system at OMAF

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

other programs for assistance are in various stages of automation

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Capital
Improvements
Branch

Foodland Preservation
and Improvements

Ontario Ministry of
Agriculture and Food

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA							
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1 Operating NORDA Program	○	○	○	○	○	●	○	○
2 Operating Tile Drainage Program	○	○	○	○	○	●	○	●
3 Operating Municipal Drainage Program	○	○	○	○	○	○	○	○

AGENCY FUNCTIONS	CARTOGRAPHIC DATA						
	GENERATION						STORAGE
	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Operating NORDA Program							
2 Operating Tile Drainage Program							◐
3 Operating Municipal Drainage Program							□

AGENCY FUNCTIONS	CARTOGRAPHIC DATA — MANIPULATION / ANALYSIS													
	GEOMETRIC ANALYSIS													
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Operating NORDA Program														
2 Operating Tile Drainage Program	□			◐			□		◐		◐			
3 Operating Municipal Drainage Program														

AGENCY FUNCTIONS	CARTOGRAPHIC DATA — MANIPULATION / ANALYSIS													
	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Operating NORDA Program														
2 Operating Tile Drainage Program													□	◐
3 Operating Municipal Drainage Program														

AGENCY FUNCTIONS	CARTOGRAPHIC DATA — DISPLAY									
	COMPOSITION					PRESENTATION				
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Operating NORDA Program										
2 Operating Tile Drainage Program						◐		◐		◐
3 Operating Municipal Drainage Program								○		

AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Operating NORDA Program				○	○	○	○						
2 Operating Tile Drainage Program				○	○	○	○						
3 Operating Municipal Drainage Program				○	○	○	○						

2.3.2 FOODLAND PRESERVATION BRANCH

ORGANIZATION AND RESPONSIBILITIES

The primary mandate of this Branch is in the administration of policy guidelines with regard to foodland preservation. In this capacity it provides input to the provincial planning process of various ministries, including MTC, as well as municipalities, utility companies and so forth. The emphasis of this Section is on policy and drafting legislation. The director provides input from the agricultural section in order to protect the interests of the Ministry of Agriculture and Food regarding the preservation of agricultural land. The Section is also responsible for the administration of the Non-Resident Agricultural Land Interests Registration Act. It also performs a number of other related functions for the Ministry, including:

1. maintaining non-resident ownership registries;
2. assisting municipalities in the implementation of the Foodland Guidelines;
3. assisting public government agencies (specifically, the Ontario Housing Corporation) in managing large farm leasing programs; and
4. providing advice to the Ministry of Natural Resources on various reforestation programs.

The Branch's staff consists of 14 persons.

TASKS/SYSTEMS

1. Administer Foodland Guidelines

Administratively, the workforce is balanced among six districts. The field offices handle all the severance applications. There are six field personnel who process severances, including most of the input for severances at the municipal level. For more difficult situations, where representation must be made to the Ontario Municipal Board, the field staff collect the appropriate data and prepare draft comments for submission to the Director's Office. The field staff is also responsible for preparing comments for official plan amendments, comments on the establishment of various corridors, and so forth.

Applications for aggregate extraction from gravel pits are reviewed by the field staff. The normal procedure involves the changes in designation of land use from agriculture to extraction. The field staff provide the appropriate input to represent the interests of the Ministry of Agriculture and Food.

Field staff are also involved in a similar capacity for MTC related projects, such as highway expansion, road widening, etc. In a like manner, they also comment on other activities, such as MNR's land use strategies.

Another area of concern addressed by field staff is the watershed plans of the Conservation Authorities.

The data sources involved in performing this task include the official plans for the municipalities, data from the Mine Registry Office, tile drainage maps, and soil maps. This information is derived from a variety of sources, including the Town Clerk's Office, as well as municipal, provincial and federal agencies. Manual files are kept for each project. The field offices prepare documentation and provide appropriate input as required. Details are sent to Queen's Park for review and action, as appropriate. Other data sources involved in this process are the NTS map sheets at a scale of 1:50 000. These maps are used for reference in the land base, specifically, for classification and inventory purposes. Both the Canada land inventory and the Ontario land inventory which they use, are based on the 1:50 000 NTS map sheets.

2. Maintain Non-Resident Ownership Register

The Non-Resident Ownership Act requires that all non-residents register with this office within 90 days of purchase of farmland within Ontario. This data is maintained as an inventory and is used to monitor foreign ownership. At the same time, a 20% tax is levied by Revenue Canada for lands acquired by non-residents.

The information maintained at the time of application includes the following data items:

a. property description, in terms of township, concession and lot;
b. the name of applicant;
c. postal address of applicant;
d. acreage involved;
e. type of entity purchasing the land, for example, corporation, etc.; and
f. form of acquisition (a copy of this form is contained in the Appendix).

This Office publishes interim reports on registration data based on the amount of land within counties and the percentage of foreign ownership. This information is based on a computer file which currently maintains approximately 1,200 farm properties involving 165,000 acres. This is approximately 1% of the total 16.5 million acres of farmland within Ontario.

A mechanism is provided for deferral of the 20% tax. This is based on immigration to Ontario within a two-year period from the date of purchase of the property.

At this time, this Office focuses concern on the administration and monitoring of the non-resident ownership of farmland within the province.

3. Administer Farm Leasing Program

The Ministry of Municipal Affairs and Housing (Ontario Land

Corporation) currently owns a good deal of land which is maintained in landbanks for subsequent development. This land was purchased a number of years ago and in various locations, such as Pickering, Townsend, South Cayuga and Cambridge. There are approximately 600 to 700 parcels involved. This land is not currently in use for its intended purposes and as such is leased out to farmers for farming.

The Foodland Preservation Branch provides consulting services and information to the Ministry of Municipal Affairs and Housing and the Ministry of Government Services as to the quality of the land, rental values, the amount of working land, etc. In this role it recommends the rental rate and the system of selection of tenants. There is a simple mechanism for determining the potential of the land based on the amount of a particular farm class of land. Each class is weighed and the values tallied to produce a fair rental value for the property.

Properties involved are referenced by means of township, concession and lot. This tasks is meaningful only in the context that it can be disposed of at fair market value to recoup the original cost to the government.

4. Administer Top Soil Preservation Act

The Foodland Preservation Branch is also involved in administering the Top Soil Preservation Act. Currently, there is enabling legislation which allows municipalities to pass bylaws prohibiting the stripping of top soil from farmland. The Foodland Preservation Branch assists municipalities by providing advice in developing and enforcing necessary bylaws.

In each of these tasks, the Foodland Preservation Branch performs in a reactive role. Essentially, the Branch reacts to other agencies and the public, and as such are not creators of information. Where necessary, the Branch relies on various outside sources of information (i.e., tax authorities) in performing its tasks. There is a reference to spatial information in terms of township, concession, lot, etc. At this time, much of the data is maintained in manual format with limited computer inventories.

OBSERVATIONS

The Foodland Preservation Branch is actively involved in land-related activities, primarily, in executing its mandate to protect farmland. At this time, much of the work is performed using manual methods which have evolved over time. It is clear that in time with the availability of generalized land-related and geographical referencing functions the efficiency and the potential value, such functions could be improved considerably.

There is extensive co-operation and data sharing between this Branch and many other branches and agencies within the Provincial Government, such as the Ministries of Revenue, Municipal Affairs and Housing, and Transportation and Communications, as well as municipalities.

FUTURE NEEDS AND WANTS

The Foodland Preservation Branch needs to have a more detailed description of the farm base and access to land-related inventories for farms, such as property assessment data, ownership data, etc. Access is required on a county and township basis with further classification desired by concession and lot.

There is a need for a generalized query language for cross-referencing various AGF statistical, CLI soils, and other data bases. It is also necessary to look at different facets of the parcel data, which entails accessing a variety of data bases, all of which may be related to a parcel.

There is also a need for a more encompassing data base related to the landmass. As a means of developing policies for land use, it would be desirable to have a modelling capability which can relate the value of land to other values. Other variables which could be purposefully related to the landmass would be climate, drainage, farm owner, agricultural status, and more.

G.I.S. POTENTIAL

There is considerable potential for using a G.I.S. system within the Foodland Preservation Branch. At present, much of the activity is done manually. However, with the availability of a geographical information system, there would be potential for performing more extensive correlations between the landmass and its agricultural values. A basic requirement would be a facility for modelling of farmlands for use in policy formulation and evaluation. Modelling and statistical functions such as polygon overlay, point in polygon, buffering, and so forth, seem fundamental to many activities currently performed. Other techniques which are also currently done manually, but would benefit from automation, are proximal analysis, area/perimeter calculations, contiguity and watershed analyses, and queries. Map documentation of these analyses would be useful as well.

The scope of G.I.S. potential for the Foodland Preservation Branch is rather encompassing ranging from the creation and management of simple inventories to more complex spatial analysis and modelling of agricultural and environmental data.

DATA SOURCE INFORMATION SHEET

TITLE: NON RESIDENT OWNERSHIP REGISTRY

SOURCE AGENCY: Foodland Preservation Branch

PERSON: Mr. Donald Dunn

TITLE: Director, Foodland Preservatio Branch, 8th Floor

ADDRESS:
801 Bay Street
Toronto, Ont. M7A 2B2

PHONE: 416-965-9433

DESCRIPTION: An inventory of non-resident persons or companies having an interest in farmland in Ontario.

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	disk
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 1,200 registration

GROWTH RATE: Variable. Anywhere 50 to 100 per year

DATA ITEMS:
- -Name of person or companies having interest in land and address
- -Location of land
- - Description of land
- - How the interest was acquired and date

RETRIEVAL KEY(S):
- - by county/township
- - by person name (confidential)

GEOCODE:
address of land

DATE OF CREATION: 1980 Retroactive to 1930

FREQUENCY OF UPDATE:
on going

COVERAGE/COMPLETENESS:
entire province

SOURCE OF INFORMATION:
onus by law on person who has land interest to register with the branch

USERS OF INFORMATION:
- - Foodland Preservation Branch
- - The Public and other interested government branches

VOLUME/FREQUENCY OF USE:

Periodically utilized by the Branch

ACCESS METHOD FOR USER:

computer output via batch processing

AVAILABILITY: names of persons holding interest is confidential otherwise, open

CHARGES:
N/A

HARDWARE AND LOCATION:
Queen's Park computer facilities

SOFTWARE:

unknown

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: FOODLAND PRESERVATION BRANCH

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

			TABULAR DATA								CARTOGRAPHIC DATA																																												IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
											GENERATION						STORAGE	MANIPULATION / ANALYSIS																													DISPLAY																						
																		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																		
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Maintaining non-resident ownership registries	○	●	●	●	●	●	●	●								◐			◐		◐			◐		◐			◐					◐				◐				◐	◐					◐	◐				◐			□										

2.4 QUALITY AND STANDARDS DIVISION

2.4.1 DAIRY INSPECTION BRANCH

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of this Branch is to improve the quality of milk produced and marketed in Ontario. This mandate is derived from the Milk Act. Approximately $25 million is spent administering this program each year. There are approximately 11,300 milk producers operating in the province, down from 22,000 in 1967. Fifty field staff, distributed among fifteen field offices, are involved in fulfilling this responsibility.

The Ministry of Agriculture and Food assumed responsibility for overseeing the quality of milk after 1958. Previously, inspections were done by local health units of the various municipalities to which milk was delivered.

This Branch works very closely with the Ontario Milk Marketing Board (OMMB). Its role is defined by regulation and involves a good deal of effort directed towards quality assurance and inspection of farms. It dedicates approximately 50% of its time in achieving these requirements.

TASKS/SYSTEMS

1. Analysis of Milk Quality

The primary function performed by this Section is to ensure quality control. This is achieved through a variety of testing and inspection procedures. Each pickup at the farm is sampled by the driver and the sample is maintained for analysis by the Dairy Inspection Branch. On a monthly basis, there is also an extensive quality testing and reporting function. This information is fed back to the producer to inform him of his standing with regard to quality. Currently, there are a number of comprehensive unannounced farm inspections.

After testing, several reports are produced. These include the Milk Sample Report, Milk Quality Report, and the Farm Service Report, examples of which are contained in the **Appendix**. The testing-reporting function is very important in maintaining milk quality. The reports may involve warnings or penalties to the producer. This information is also reported to the Milk Marketing Board, and is used in determining the monthly payment to the producer. The Milk Quality Report gives monthly milk quality comparisons which are useful to the producer.

Two types of reports are sent to the Ontario Milk Marketing Board: Composition Reports, and Quality Test Results. The Ontario Milk Marketing Board provides a list of all current producers at the end of each month to the Dairy Inspection Branch. This list contains a variety of data items, including: producer's name; postal address; location in terms of township, concession and lot; and licence number (which is tied to locations, specifically, the dairy barns), etc. All producers are plotted on maps maintained by the Ontario Milk Marketing Board. Also the data maintained by the OMMB is confidential and is not in the public domain.

OBSERVATIONS

The Dairy Inspection Branch has very strong ties with the OMMB. The Ministry of Agriculture and Food operates on a regulatory statute, while the OMMB performs a marketing and pricing control function for producers. There is a good working relationship between the two agencies, including extensive data sharing, with OMMB maintaining the data base. Some data is stored at the Queen's Park Computer Centre. The Dairy Inspection Branch also maintains a number of specialized programs which were developed by the Administrative Services Group. There are plans to automate the total process of inspections and testing.

It should be noted that there is no specific relationship between where the milk is produced, processed and ultimately marketed. Some studies have been conducted to develop standardized routes for milk pickup. These computer based programs were developed for the OMMB at Queen's University. However, it does not appear that they are currently being used.

At present, very little use is made of spatial information by this Branch, primarily, because of the nature of their current mandate. However, there is a greater potential for the use of spatial information by the OMMB.

The OMMB maintains a rather large collection of programs for management of its data base. At present, there is very little spatial information within this data base. This total operation seems to be more contained, however, it does provide information which is of value to other agencies within AGF, specifically, the Statistics Section for reporting purposes.

FUTURE NEEDS AND WANTS

No major needs and wants were identified at this time.

G.I.S. POTENTIAL

Even though the Dairy Inspection Branch has little or no need for a spatial information system, there is perhaps some potential for spatial analysis by OMMB. However, the very nature of this particular activity is such that it is probably very advanced and refined at this time. The availability of a generalized geographical information system, perhaps in terms of an extended SASGRAPH capability, could be of value for a variety of analyses in terms of the distribution of suppliers and market-places.

DATA SOURCE INFORMATION SHEET

TITLE: MILK QUALITY REPORTS

SOURCE AGENCY: Dairy Inspection Branch
PERSON: Mr. Glenn Ward
TITLE: Manager Producer Section
ADDRESS: 801 Bay Street
Toronto, Ont. M7A 2B2

PHONE: 416-965-2411

DESCRIPTION: A summary of milk quality tests undertaken periodically to maintain an acceptable standard of milk quality

FORMAT:

	M	A	MEDIA	
MAP				
TABULAR		X	disk	
IMAGE				
TEXT				
LIBRARY				

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 135,600 tests results for 11,300 producers over 12 months.

GROWTH RATE:
11,300 results each month added

DATA ITEMS: 12 months of data maintained
- address of milk producer
- bacteria test results for previous 4 months.
- Recommendations
- OMMB license number

RETRIEVAL KEY(S):
- Name
- OMMB License number

GEOCODE:

Farm address

DATE OF CREATION: unknown

FREQUENCY OF UPDATE:
monthly

COVERAGE/COMPLETENESS:
all dairy producers in Ontario

SOURCE OF INFORMATION:
Dairy Producers
- milk samples

USERS OF INFORMATION:
The Dairy Inspection Branch
- OMMB

VOLUME/FREQUENCY OF USE:
daily

ACCESS METHOD FOR USER:
through terminal linked to Queen's Park computer

AVAILABILITY:
not available to public

CHARGES:
N/A

HARDWARE AND LOCATION:
Queen's Park computer facilities

SOFTWARE:
unknown

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: FARM SERVICE REPORTS

SOURCE AGENCY: Dairy Inspection Branch
PERSON: Mr. Glenn Ward
TITLE: Manager Producer Section
ADDRESS: 801 Bay Street
Toronto, Ont. M7A 2B2

PHONE: (416) 965-2411

DESCRIPTION:
A summary report of inspection of milk producing facilities

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	disk
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME:
11,300 reports

GROWTH RATE: approximately 11,300 per year

DATA ITEMS:
- address of producer dairy farm
- OMMB license number
- evaluation of facilities ie their condition
- results of milk quality reports

RETRIEVAL KEY(S):
name of producer
OMMB license number

GEOCODE:
address of producer
address of dairy farm

DATE OF CREATION:
unknown

FREQUENCY OF UPDATE:
as required usually once per year

COVERAGE/COMPLETENESS:
All dairy producers in Ontario

SOURCE OF INFORMATION:
dairy producers

USERS OF INFORMATION:
- dairy inspection branch
- OMMB

VOLUME/FREQUENCY OF USE:
occasional

ACCESS METHOD FOR USER:
through terminal linked to Queen's Park computing facilities

AVAILABILITY:
not available to public

CHARGES:
N/A

HARDWARE AND LOCATION:
Queen's Park Computing Facilities

SOFTWARE:
unknown

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: DAIRY INSPECTION
BRANCH
801 BAY STREET
TORONTO, ONTARIO

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

			TABULAR DATA								CARTOGRAPHIC DATA						
											GENERATION						STORAGE
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
AGENCY FUNCTIONS	1	Analyze Milk Quality	○	●	●	●	●	●	●	●							
		Inspect Dairy Farms	○	●	●	●	●	●	●	●							

			CARTOGRAPHIC DATA													
			MANIPULATION / ANALYSIS													
			GEOMETRIC ANALYSIS													
			POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
AGENCY FUNCTIONS	1	Analyze Milk Quality														
		Inspect Dairy Farms														

			CARTOGRAPHIC DATA													
			MANIPULATION / ANALYSIS													
			NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
			OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
AGENCY FUNCTIONS	1	Analyze Milk Quality														
		Inspect Dairy Farms														

			CARTOGRAPHIC DATA									
			DISPLAY									
			COMPOSITION					PRESENTATION				
			QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
AGENCY FUNCTIONS	1	Analyze Milk Quality										
		Inspect Dairy Farms										

			IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
			COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Analyze Milk Quality													
		Inspect Dairy Farms													

2.5 EDUCATION AND RESEARCH DIVISION

2.5.1 INSTITUTE OF PEDOLOGY

ORGANIZATION AND RESPONSIBILITIES

The Institute of Pedology is responsible for the Soils Survey of Ontario, which is the Ontario component of the Canadian Soils Information System (CANSIS). In executing this mandate, they collect extensive data for creating and maintaining a soils inventory for Ontario. In this capacity, they not only maintain data files on soils but also produce soil polygon maps. The Instutute of Pedology has 5 full-time staff members.

TASKS/SYSTEMS

1. Create Soils Inventory

The creation of a soils inventory requires several tasks. Initially, stereo aerial photographs are used to identify land forms, drainage patterns, and so on. Since it is necessary to separate the soils material into sands, gravel, etc., it may be required to traverse the area by both road and foot for field inspection. During this process, samples are collected for subsequent laboratory analysis. There is also a visual inspection of the landscape to note drainage details and soil structure.

The classification of soils is performed as per CANSIS procedures which are used as a national standard. The three main documents are:

1. Soils Mapping Section
2. Manual for Describing Soils in the Field
3. Canada System for Soil Taxonomy

The reference base used is the NTS 1:25 000 and 1:50 000 scale maps. These are preferred because of:

a. continuous coverage with no boundary problems
b. colour for ease of reading
c. coverage of all farm lands

2. Maintain Soil Survey

The Ontario Soils Survey is concerned with the creation and maintenance of a soils survey for Ontario. This is achieved through a process which involves both extensive field work supplemented by laboratory analysis.

Field data collection involves the collection of relevant data describing soil profiles and site conditions. Much of the data collected is based on an understanding of soil environment. A large number of field data items are observed and recorded on a formatted data form. These are decribed in detail in "Manual for Describing Soils in the Field" (1978 Revision), published by the Land Resource Research Institute, Research Branch, Agriculture Canada, Ontario.

The information recorded on the data sheets is used as input to several computer files for subsequent interrogation. The data is derived from visual observations and detailed analysis of core profiles to depths of 1 metre.

3. Digitize Polygon Maps

A computer based system has been acquired for digitizing the polygon maps for use within a digital environment. This system was developed by Collins and Moon of Guelph according to specifications provided by staff at the Institute of Pedology. The system operates on an IBM PC and is capable of addressing a 12 Mbyte disc storage which can be output to tape.

Digitizing is done on a 36"x48" digitizer table using a 12 button cursor. The system is menu driven and provides for the automatic collection and specification of soil polygons. The polygons can be displayed on a Tektronix 4112 as well as be drawn on a small 11"x17" CALCOMP plotter. Recently, a CALCOMP 1073 plotter has been acquired and the software extended to provide an enhanced display capability.

The data collected can be transmitted over telephone lines to a host processor where the main data bases are kept (e.g., University of Guelph Amdahl and Data Crown in Toronto for soils attribute data files).

The digitizing was originally part of the cartographic process and represented the final stage of map production. The data is now digitized from information collected in the field. Essentially, the field data is superimposed on county maps extracted from the NTS maps.

Since the output of this system is data compatible with CANSIS, it can be used to update the CANSIS information base.

At present, a soils technician requires approximately 2 to 3 weeks per map sheet for digitizing. Each soils scientist covers approximately 200,000 acres per year.

FUTURE NEEDS AND WANTS

The Soils Section has need of a good set of base maps which can be used to superimpose the soils data. At present, the NTS maps (1:50 000 or 1:25 000) are used, however, the availability of OBM maps with extensive coverage would greatly facilitate their tasks. This map base would be used to provide county maps for the soils survey.

There is a need to have access to a good topographic base in order to be able to relate to the physical features. It is also desirable to see the lot fabric for purpose of relating to the ground and subsequently correlating yield data to soil type.

OBSERVATIONS

The soils survey is an extensive undertaking which provides a valuable inventory for resource management. The system is evolving from a manual operation to one in which automated tools are being used to facilitate all aspects of the task from data collection to data management.

The current polygon data capture system is operational, however, since it is very recent, will likely require some enhancements.

The soils inventory in digital format provides a potential for use by other agencies in a planning and management capacity. This could be a significant component in the context of a comprehensive Ministry of Agriculture and Food data base.

G.I.S. POTENTIAL

There is significant potential for employing a G.I.S. system to handle soils-related data. The interaction of soil polygon systems with other polygon systems such as ownership parcels, land use, etc. can be used to advantage by means of a polygon overlay capability for a variety of resource management and planning functions. The encoding and maintenance of attribute data within CANSIS provides an extensive inventory which can be correlated with other data bases such as yield production data, etc.

Even though the CANSIS system is maintained with respect to the 1:50 000 NTS base, it should be possible to readily correlate this data to data related to the OBM series. This would require a generalized windowing capability across the NTS map sheets from which townships can be extracted and related to OBM map features.

This data could be of interest to many provincial, regional, and municipal agencies either on-line or in terms of formatted data files.

DATA SOURCE INFORMATION SHEET

TITLE: SPECIAL PROJECTS FILE

SOURCE AGENCY: Ministry of Agriculture and Food
PERSON:
TITLE:
ADDRESS:

PHONE:
DESCRIPTION: subfiles of soils data file, performance reports, summaries, any maps.

FORMAT:

	M	A	MEDIA
MAP	x		
TABULAR	x		
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME:

GROWTH RATE:

DATA ITEMS:

RETRIEVAL KEY(S):

GEOCODE:

DATE OF CREATION:

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Ministry of Agriculture and Food

USERS OF INFORMATION: Ministry of Agriculture and Food

VOLUME/FREQUENCY OF USE:

ACCESS METHOD FOR USER:

AVAILABILITY:

CHARGES:

HARDWARE AND LOCATION:

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: SOIL SURVEY

SOURCE AGENCY: Ministry of Agriculture and Food

PERSON:

TITLE:

ADDRESS:

PHONE:

DESCRIPTION: comprehensive soil survey for Ontario

FORMAT:

	M	A	MEDIA
MAP	x	x	
TABULAR	x	x	
IMAGE	x		
TEXT	x		
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: limited due to generalised product and procedures

SIZE/VOLUME: 3-6 acres

GROWTH RATE:

DATA ITEMS:

RETRIEVAL KEY(S): Provincial site identification number

GEOCODE: Prov.

DATE OF CREATION:

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS: farm lands in Ontario

SOURCE OF INFORMATION: Soil/Surveys

USERS OF INFORMATION:

- Ministry of Agriculture and Food
- Farmers
- Engineers
- Planners

VOLUME/FREQUENCY OF USE: Published documents and maps for user community

ACCESS METHOD FOR USER: Soils maps and publications

AVAILABILITY: general

CHARGES:

HARDWARE AND LOCATION:

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: SOIL DATA FILE
(Detail File)

SOURCE AGENCY:

PERSON:

TITLE:

ADDRESS:

PHONE:

DESCRIPTION: modal site information and analysis

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: consistent with soil survey

SIZE/VOLUME: 3-6 acres

GROWTH RATE:

DATA ITEMS:

RETRIEVAL KEY(S):

GEOCODE:

DATE OF CREATION: 1974

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS: County

SOURCE OF INFORMATION: field surveys

USERS OF INFORMATION:
-Ministry of Agriculture and Food
-consulting engineers

VOLUME/FREQUENCY OF USE:

ACCESS METHOD FOR USER: report from CANSIS

AVAILABILITY: general

CHARGES: processing costs

HARDWARE AND LOCATION: Data Crown, Toronto

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: SOIL NAMES FILE

SOURCE AGENCY: CANSIS
PERSON: Agriculture Canada
TITLE:
ADDRESS:

PHONE:

DESCRIPTION: a listing of all soil names currently used in Canada

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME:

GROWTH RATE:

DATA ITEMS: soil name, soil code, classification, credibility, mode of deposition, particle size, minerology, depth, reaction, calcareousnous, soil temperature, soil moisture, location.

RETRIEVAL KEY(S):

GEOCODE: location

DATE OF CREATION:

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS:

SOURCE OF INFORMATION: CANSIS Committee

USERS OF INFORMATION: Ministry of Agriculture and Food

VOLUME/FREQUENCY OF USE:

ACCESS METHOD FOR USER: interactive on Datapac Network

AVAILABILITY:

CHARGES: processing charges

HARDWARE AND LOCATION: Data Crown - Toronto, Ontario

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: PERFORMANCE MANAGEMENT FILE

SOURCE AGENCY: Ministyry of Agriculture and Food
PERSON:
TITLE:
ADDRESS:

PHONE:

DESCRIPTION: files containing experimental and generalized crop performance data as well as soil data

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME:

GROWTH RATE:

DATA ITEMS: crop yields, quality, growth, development, location, design, management, weather, soils.

RETRIEVAL KEY(S):

GEOCODE:

DATE OF CREATION:

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS:

SOURCE OF INFORMATION:

USERS OF INFORMATION:

VOLUME/FREQUENCY OF USE:

ACCESS METHOD FOR USER: interactive, reports

AVAILABILITY: general

CHARGES: processing charges

HARDWARE AND LOCATION: Data Crown, Toronto

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: CARTOGRAPHIC FILE

SOURCE AGENCY: Institute of Pedology

PERSON: Ministry of Agriculture and
TITLE: Food
ADDRESS: Guelph

PHONE:

DESCRIPTION: digitized soil maps

FORMAT:

	M	A	MEDIA
MAP		x	
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1:50 000

ACCURACY/RESOLUTION:

SIZE/VOLUME: ~ 70

GROWTH RATE: 15 per year

DATA ITEMS:

RETRIEVAL KEY(S): map sheet (county)

GEOCODE: county

DATE OF CREATION: 1974

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS:

SOURCE OF INFORMATION: soils survey

USERS OF INFORMATION:
- Ministry of Agriculture & Food
- engineers
- planners

VOLUME/FREQUENCY OF USE:

ACCESS METHOD FOR USER: map

AVAILABILITY: general

CHARGES:

HARDWARE AND LOCATION:

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: LAND POTENTIAL FILE

SOURCE AGENCY: Ministry of Agriculture and Food / CANSIS
PERSON:
TITLE:
ADDRESS:

PHONE:

DESCRIPTION: nationwide crop information

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME:

GROWTH RATE:

DATA ITEMS: soil, climate, capability, biomass production, potential yields for various crops.

RETRIEVAL KEY(S):

GEOCODE:

DATE OF CREATION:

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS: national/Ontario

SOURCE OF INFORMATION:

USERS OF INFORMATION: Ministry of Agriculture and Food

VOLUME/FREQUENCY OF USE:

ACCESS METHOD FOR USER: summaries, reports, maps

AVAILABILITY: general

CHARGES:

HARDWARE AND LOCATION:

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: ONTARIO DAILY FILE

SOURCE AGENCY: Ministry of Agriculture and
PERSON: Food
TITLE: Institute of Pedology
ADDRESS:

PHONE:

DESCRIPTION: abbreviated daily site for documentation of field work

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME:

GROWTH RATE:

DATA ITEMS: location attributes, parent material, site attributes, profile descriptions, particle size analysis

RETRIEVAL KEY(S): location

GEOCODE: location

DATE OF CREATION:

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS:

SOURCE OF INFORMATION: Ministry of Agriculture and Food

USERS OF INFORMATION: Ministry of Agriculture and Food

VOLUME/FREQUENCY OF USE:

ACCESS METHOD FOR USER:

AVAILABILITY: general

CHARGES:

HARDWARE AND LOCATION:

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

3 MINISTRY OF CITIZENSHIP AND CULTURE

3.1 OVERVIEW

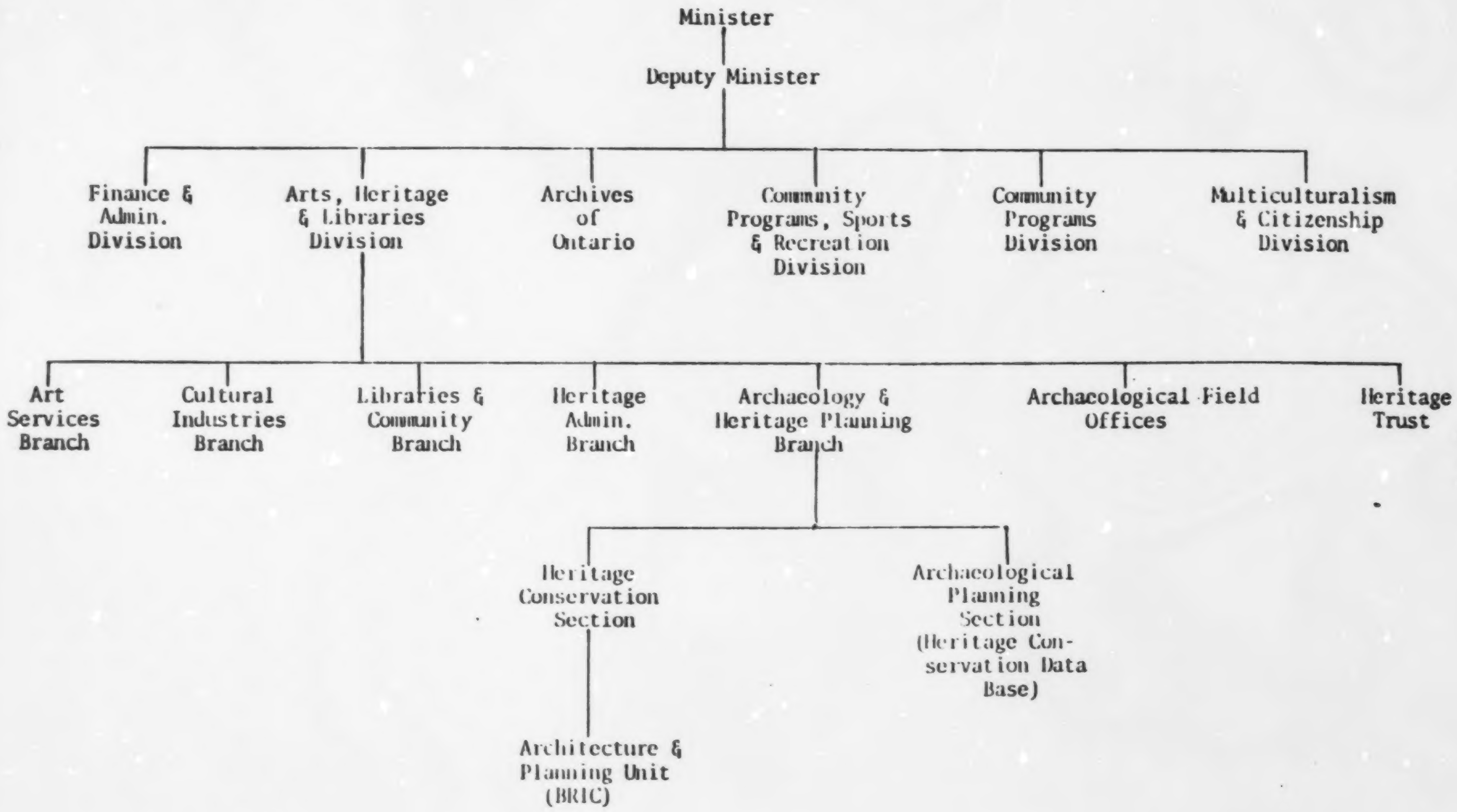
The primary responsibility of this Ministry is to develop and monitor policies and programs related to libraries, multiculturalism, community information, citizenship and heritage conservation. The Ministry is organized in six divisions in order to carry out its mandate, which are illustrated in the Ministry organization chart shown in **Figure 3.1-A**. The Arts, Heritage and Libraries Division, which is made up of seven branches, deals in part with land-related information. Specifically, the Archaeology and Heritage Planning Branch utilizes two land-related information systems.

The Ministry of Citizenship and Culture is administratively divided into six regions: Northwestern, Northeastern, Eastern, Central East, Central West, and Southwestern Regions. These regional boundaries are unique to the Ministry of Citizenship and Culture.

The Archaeology and Heritage Planning Branch administers the Ontario Heritage Act, Municipal Planning Act and other legislation dealing with the recovery of underwater artifacts, environmental assessment and cemeteries. In administering the legislation, the Branch ensures the conservation and preservation of the Ontario heritage. In fulfilling this mandate the Branch maintains an Ontario Heritage Inventory and issues archaeological licences to researchers.

The Branch is also responsible for monitoring the preservation and restoration of buildings of architectural significance. Specifically, the Architecture and Planning Unit administers the Building Rehabilitation and Improvement Campaign (BRIC) grant program which was developed to aid in architectural preservation.

MINISTRY OF CITIZENSHIP AND CULTURE


Minister
Deputy Minister
Finance & Admin. Division
Arts, Heritage & Libraries Division
Archives of Ontario
Community Programs, Sports & Recreation Division
Community Programs Division
Multiculturalism & Citizenship Division
Art Services Branch
Cultural Industries Branch
Libraries & Community Branch
Heritage Admin. Branch
Archaeology & Heritage Planning Branch
Archaeological Field Offices
Heritage Trust
Heritage Conservation Section
Archaeological Planning Section (Heritage Conservation Data Base)
Architecture & Planning Unit (BRIC)

. Figure 3.1-A

3.2 CULTURE DIVISION HERITAGE BRANCH

3.2.1 ARCHAEOLOGY UNIT

ORGANIZATION AND RESPONSIBILITIES

The Archaeology Unit's Heritage Branch is responsible for conserving and preserving Ontario archaeological resources for the benefit of the Ontario public. Specifically, the Unit administers the Ontario Heritage Act, the Environmental Assessment and Municipal Planning Acts, and legislation pertaining to the recovery of underwater artifacts. In fulfilling these responsibilities, the Archaeology Unit maintains an Ontario Archaeological Sites data base. This Section also advises the Ontario Heritage Foundation on archaeological licences and grants, and supports a regional fieldwork program. At head office, a staff of three is complemented by a regional staff of eleven.

TASKS/SYSTEMS

1. Issue Archaeological Licences

Pursuant to the Ontario Heritage Act, researchers conducting archaeological fieldwork must obtain a licence from this Unit. The archaeological application information is currently stored manually and includes the name of the licensee, licence number and in some cases the type of archaeological excavation to be conducted. A pilot project is being undertaken to maintain this inventory on a microcomputer, to which the six regions of the Archaeology Unit will have access.

2. Administration of the Ontario Heritage Data Base

Once the licence has been issued and fieldwork conducted, each licensee must submit a completed archaeological site record form. The information on the record form includes: Borden number, sequential site number, researcher site number, site name, alternate site name, province, county or district, township, concession, lot, NTS map number, elevation, military grid reference, easting, northing, latitude, longitude, a description of location and access and a variety of information pertinent to the excavation itself including a description of the environment, and extent of observed cultural remains, dates of artifacts, pictoral records, field notes and published material. **Figure** 3.2.1-A provides a sample of the Archaeological site record form which is used.

Researchers use the Borden system to document their archaeological sites. They obtain Borden numbers by calling the Heritage Branch and describing their site location in a narrative format, at which time the Section issues the Borden co-ordinate. The Borden system is based on latitude and longitude and divides Canada into cells which are 4° longitude by 2° latitude. Within each cell there are 10-minute by 10-minute areas. The location

Figure 3.2.1-A

Ministry of
Citizenship
and Culture
Ontario

ARCHAEOLOGICAL SITE RECORD FORM

This form is intended for the field recording of archaeological site information for sites which have not previously been documented with the Ministry of Citizenship and Culture. Use the Archaeological Site Update Sheet to record additional or corrected information concerning sites known to be in the Ministry's files. Refer to the instructions when completing the form and contact the Ministry of Citizenship and Culture for further assistance.

Borden number

SITE IDENTIFICATION

1) Borden number - Upper case Lower case
2) Sequential number 3) Researcher's site number
4) Preferred name
5) Other names/identifiers

SITE LOCATION

6) Province Ont 7) County or district
8) Township 11) NTS map
9) Concession Lot(s) 12) Copy of map segment
10) Elevation ☐ feet ☐ metres 13) Sketch map of site
14) Military grid reference - Grid zone 100,000 metre square
Easting Northing
15) Latitude ° ' " Longitude ° ' "
16) Location and access

SITE INVESTIGATION

17) Researcher
18) Licence number 19) Site observed - Year Month
20) Informant(s), Address(es), Nature of Information
21) Activities conducted at site

continued

Borden number

22) Description of environment

23) Nature, density and extent of observed cultural remains

INFERENCES

24) Dates

Basis

25) Site function/type

Basis

26) Site structure

Basis

27) Affinities

Basis

DOCUMENTATION

	Location	Nature
28) Artifact collections		
______ region		
29) Pictorial records		
______ region		
30) Field notes		
______ region		
31) Unpublished material		
______ region		

32) Published material

33) Remarks

Form completed by ______________________ Date ______________

22) Describe and account for the physical environment of the site in terms of factors such as soil or site matrix, vegetation, slope, drainage and those natural or man-induced processes (e.g. erosion by wind or water, cultivation, disturbance due to land development) which have affected and are currently affecting the site.

23) Referring to the sketch map, describe the variety and distribution of such cultural remains as artifacts, features or structures, rock art, etc.

INFERENCES

24) If possible, supply an absolute or relative date accompanied by supporting evidence.

25) State how this site might have been used and provide supporting evidence.

26) If possible, describe the inter-relationships among the cultural remains, inferring the layout of the complete site and discussing the site's relationship to local terrain. Supply supporting evidence.

27) Describe the relationship of the site to broader categories such as cultural groupings (e.g. Iroquoians), techno traditions (e.g. Laurentian Archaic), corporate groups (e.g. Huron), or cultural stages (e.g. Middle Woodland). Provide supporting evidence for your statements.

DOCUMENTATION

28) to 32) Collections and records of researchers previously involved with the site are of interest, as is documentation associated with current investigations and information on site-specific local collections. Pictorial records include such material as photographs and slides, maps and rice-paper tracings. For documentation housed in a regional office of the Ministry of Citizenship and Culture, location may be left blank and the region's abbreviation (NW, NC, NE, SW, SC, E) noted in the space marked "region".

33) Include here any comments not provided for elsewhere on the form.

SOURCES

Ministry of Citizenship and Culture
Heritage Branch
Archaeology Unit
7th Floor, 77 Bloor Street West
Toronto, Ontario
416-965-4490

Contact the Data Coordinator to obtain archaeological site record forms and update sheets, assistance in completing the forms, and information concerning access to the archaeological sites data base.

Ministry of Natural Resources
Public Service Centre
Room 1640, Whitney Block
Queen's Park
Toronto, Ontario
416-965-6511

National Topographic Series maps, Ontario Base Maps, and aerial photos are available from the Public Service Centre.

Survey Records
Room 6645, Whitney Block
Queen's Park
Toronto, Ontario
416-965-7058

Survey Records provides M-plan maps.

Ministry of Transportation and Communications
Record Services Office
1201 Wilson Avenue
Downsview, Ontario
416-248-3476

County, district and regional municipality maps may be obtained from this office.

Return original to the Ministry of Citizenship and Culture, address above.

INSTRUCTIONS

SITE IDENTIFICATION

1) The Borden Site Designation Scheme is described in the *Guide to Ontario's Archaeological Site Records* (see Sources). For assistance in determining the Borden unit in which a site is located, contact the Ministry of Citizenship and Culture (see sources).

2) In Ontario, sequential numbers are assigned only by the Ministry of Citizenship and Culture (see Sources).

3) Any systematic means of site identification other than the Borden Scheme, used by the researcher.

4) Any name by which the site is or has been known. It is preferable to record the most common local name in usage; if none exists, the researcher may assign any name he/she chooses.

5) Any additional names or identifiers, including incorrect Borden numbers, by which the site is or has been known.

SITE LOCATION

6) Ontario.

7) County may be obtained from recent Ministry of Transportation and Communications (M.T.C.) maps or from local sources. Record Regional Municipality where more appropriate. In areas of the province that are not organized into counties, record the district.

8) Township may be obtained from recent M.T.C. maps or from local sources. Leave blank for areas of the province that are not organized into townships.

9) Lot and concession may be determined from recent M.T.C. maps or from local sources. Where lots do not exist, leave blank.

10) Approximate elevation may be determined from small scale N.T.S. maps. Indicate whether elevation is supplied in feet or metres. Do not convert from feet to metres or vice versa.

11) Index number of smallest scale National Topographic Series (N.T.S.) map upon which site location appears. For most of Ontario, this will be a 1:50,000 scale map, although portions of southwestern Ontario are covered at a scale of 1:25,000. Some areas of northern Ontario covered only by N.T.S. 1:250,000 maps are mapped at approximately 1:32,000 through the Ministry of Natural Resources M-plan series. These maps may be used in communicating the site location, however, reference to an N.T.S. map is still required.

12) Photocopy the section of the smallest scale N.T.S. map upon which the site location appears. Label this copy with the map index number and the Borden number of the site. Clearly mark the exact location of the site on the copy, using a pen of contrasting colour. The location should be consistent with the military grid reference and elevation given.

13) Draw on a separate sheet of paper, a sketch map of the site and its environs. The map should portray the results of your investigation so as to enable the site to be relocated in the field, to permit the site location to be accurately communicated for land use planning purposes, to provide an understanding of the site's situation in the landscape, and to indicate the areas where activities were conducted on the site. Include the following:

- a) scale;
- b) direction indicator;
- c) drainage and transportation networks in the area;
- d) terrain, including key landforms;
- e) land use (e.g. fields, gravel pit, structures);
- f) areas examined;
- g) concentrations of cultural remains;
- h) delineation of site boundaries as presently understood.

Refer to the Site Investigation section of the site record form before completing map.

14) Military grid reference is explained on all small scale N.T.S. maps and in the *Guide to Ontario's Archaeological Site Records*. Using a metric ruler to calculate the third digits of both easting and northing, provide a reference to at least six digits.

15) Latitude and longitude may be calculated from small scale N.T.S. maps. Determine degrees, minutes and seconds as accurately as possible.

16) Describe the site location in an orderly manner from the general to the specific, indicating the most convenient access route and means of travel as though giving directions that would enable someone to find you at the site. Mention the relationships of local drainage and transportation networks to the site and supply accurate distances from permanent features on the landscape (e.g. building, stream, obvious point of land). Tie location description to features indicated on the accompanying sketch map.

SITE INVESTIGATION

17) The name of the person making the site observations and inferences documented on this form.

18) The archaeological licence number under which activities were conducted at the site.

19) The year and month when current investigation of the site commenced.

20) Where possible, give names and addresses of local contacts who have contributed to your understanding of the site. Indicate the kinds of information available (e.g. locational information, rumours and anecdotes). Record information on site-specific local collections under Documentation.

21) Referring to the sketch map, describe the field methods (e.g. mapping, sampling and recording techniques) that were used in the examination of this site.

identifier is an uppercase and lowercase designation for the Borden co-ordinate, plus a sequential number depending on the number of archaeological sites in a given cell.

When the Heritage Branch is notified of an archaeological excavation, it manually superimposes the site on an NTS 1:50 000 scale map for reference.

There are a number of users of the information in this data base. These include municipalites requiring information on the location of heritage sites, researchers, various internal uses within the Ministry of Citizenship and Culture for planning, Ministry of Transportation and Communications, Ministry of Consumer and Commercial Relations, native groups, the Canada Centre for Inland Waters Research, Ontario Hydro, Canadian Pacific and Canadian National Railways, museums, and consultants. In response to queries, this Section often prepares information packages, which may address the findings in a particular county or region or findings of particular cultural groups across the province.

OBSERVATIONS

The Unit is undertaking a pilot project which will make available part of the data base to the six ministerial regions. It is anticipated that parts of the Heritage Branch data base can be incorporated into a microcomputer for a variety of data manipulations and analyses to be conducted by the regions. Such analyses could include the frequency, distribution and T-test or population analyses with regard to artifacts and statistics which would indicate regional needs and resources for archaeological studies.

Currently, a microcomputer resides in the Kenora and the Southcentral Region. It is anticipated that a microcomputer will reside at each of the regional offices and telecommunication would provide an information network. The inventory of licensees would also be maintained on this system as well as a variety of payroll information.

The Heritage Branch data base currently resides in Ottawa. The Unit has access to the data base through a terminal and printer with a modum. This Unit, however, updates and maintains the data base on-line.

FUTURE NEEDS AND WANTS

The Archaeology Unit indicated a need for computerized plotting of archaeological sites on base maps. Currently, the manual system of superimposing archaeological sites on NTS map series has presented a variety of problems. The base data on each map is usually not up-to-date since the work to superimpose all of the sites onto a new issue NTS map series is much too time-consuming to be completed by this Unit. As a result, all of their site information is superimposed on a particular year's map series resulting in base data being out-of-date.

The ability to interactively display the site information on a screen would be beneficial in answering queries for Borden numbers. For example, one could locate the archaeological site within a window on the screen and generate the Borden number from this window.

The Unit also requires access to various other data which resides in other ministries. Such data would include soil, forestry and geological data. On-line access to such information would be beneficial in planning for possible future archaeological sites.

G.I.S. POTENTIAL

There are a number of specific generic software procedures that this Unit could use if a geographical information system were available. Particularly, point in polygon searches would be of extreme benefit in planning possible future archaeological sites. These searches could be conducted by a watershed or also by a users specified window such as county. Polygon overlay would also be useful for determining site suitability for possible archaeological excavations. Using position as a common reference point, the Unit could access information from a variety of other sources and use the information, such as soils, forestry, etc., in planning and in conducting various data manipulations in research studies.

The most beneficial aspect of a G.I.S. system for this Unit would be the provision of a digital base onto which this Unit would superimpose its point site data. It is important that this base be continually updated.

DATA SOURCE INFORMATION SHEET

TITLE: ONTARIO HERITAGE DATA BASE

SOURCE AGENCY: Ministry of Citizenship and Culture
PERSON: Donna McNeil
TITLE: Archaeological Data Co-ordinator
ADDRESS: 77 Bloor Street West
Toronto, Ontario

PHONE: (416) 965-4490

DESCRIPTION: inventory of field recording of archaeological site information

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 8,000 sites

GROWTH RATE: unknown, 300 per year estimate

DATA ITEMS: Borden number, sequentially assigned number, researcher's site number, site name, other site names, province, county or district, township, NTS map number, concession, lot, elevation, UTM, long./lat., narrative of access description, researcher's name, researcher's licence number, date of excavation, informant's address and information, activities conducted on site

RETRIEVAL KEY(S):

GEOCODE: Borden number (lat./long.), province, county or district, township, lot, concession

DATE OF CREATION: 1975

FREQUENCY OF UPDATE: once a week

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Archaeological Site Record Form and Archaeological Site Update Form

USERS OF INFORMATION: Heritage Branch, researchers, general public, universities, MTC, MCCR, Ontario Hydro, railways, museums, archaeological licensees, consulting firms

VOLUME/FREQUENCY OF USE: 30 times a month

ACCESS METHOD FOR USER: phone

AVAILABILITY: discretionary

CHARGES: none

HARDWARE AND LOCATION: Ottawa Cyber Series, Ottawa

SOFTWARE: Paris data base, Control data, Ohio

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Archaeology Unit

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Maintain Ontario Heritage Data Base	○	●	●	●		●	●	☐

AGENCY FUNCTIONS		CARTOGRAPHIC DATA						
		GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Maintain Ontario Heritage Data Base							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Maintain Ontario Heritage Data Base	☐			☐			☐							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA														
		MANIPULATION / ANALYSIS														
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Maintain Ontario Heritage Data Base													●	●

AGENCY FUNCTIONS		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Maintain Ontario Heritage Data Base					●		●			

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Maintain Ontario Heritage Data Base													

3.2.2 BUILDING REHABILITATION AND IMPROVEMENT CAMPAIGN (BRIC)

ORGANIZATION AND RESPONSIBILITIES

The Architecture and Planning Unit has a number of responsibilities. These include:

1) Advising other ministries on heritage conservation for buildings in the course of environmental assessments or official plans.

2) Working with various ministries and organizations on heritage projects (e.g., the Ministry of Government Services to develop a property inventory for heritage buildings, MTC on heritage bridges, Ontario Hydro on generating stations, etc.).

3) Acting as the staff for the Ontario Heritage Foundation in the capacity of consultants with regard to architecture and buildings.

4) Administering and assessing the Building, Rehabiliation and Improvement Campaign (BRIC) Grant Program.

A staff of ten permanent professionals and some contractors complete the functions required to fulfill these responsibilities.

Administering the BRIC Program and conducting environmental assessments have a major land-related component associated with them, which are described below.

TASKS/SYSTEMS

1. Administer BRIC Grant Program

The BRIC Grant Program began in 1982, and is designed to address four areas. Currently in operation are the Corporate Sector Grants, the designated Property Grants and the Heritage Conservation District Funds. The Municipal Heritage Funds will be in operation in the near future.

Grants are issued after an application form has been completed and after the building or district has been designated under the Ontario Heritage Act. It is the responsibility of the local municipality to apply for heritage conservation designation. The Unit reviews and assesses the quality of the proposed restoration plan, and issues a grant for up to 50% of eligible renovation costs.

Currently, the application information is maintained on a manual system, although thought has been given to automating much of this data. BRIC information is filed by a number related to financial files, into which the district or region code, the municipal codes, and a sequentially assigned project number are incorporated. Information on the form includes address of building, proposed cost of restoration, financial code and data pertinent to architectural design.

Since this is a relatively new program, requests have been made to conduct a number of studies for program evaluation. However, the Unit requires much more information, including an inventory of designated heritage buildings across the province in order to adequately conduct such studies.

2. Review Environmental Assessments

The Architecture and Planning Unit also reviews a number of environmental assessments with regard to a heritage building inventory. Generally, consultants perform the work and provide the information to this Unit as part of the Environmental Assessment. For example, a certain area may be specified by the proponents with advice from this Unit. Then the consultant conducts a survey in that area to determine the inventory of the heritage buildings in the vicinity, likely environmental impacts and proposed mitigating measures.

OBSERVATIONS

The Unit has access to an IBM personal computer and would like to develop a comprehensive data base in order to administer the BRIC Grants Program. The data base would be used mainly as an inventory mechanism for maintaining heritage site information including the location and specific data concerning the structure of the building, the architectural type, the use of the building, etc. based on information contained in grant applications.

The Unit suffers from a lack of complete information on the total number of the heritage buildings to which the BRIC grants could apply, thus making evaluation of the BRIC Program extremely difficult. The Unit uses a variety of data which it obtains from a number of different sources. Some of the inventory data that resides in this Section, however, is not easily accessible from the current manual system. As a result, this Unit has a desire to use a geographical reference tool, for example, to catalogue site types and features and regional variations in the province in order to better assess the BRIC Program.

FUTURE NEEDS AND WANTS

The Section would also like access to a digital map of the province on which it could superimpose its point data for building locations. This would help to determine areas where the program could be better promoted and could also help to identify the uniqueness of certain buildings and building characteristics found in the province.

The Unit would also like to develop a historical atlas which would provide historical maps of particular areas in the province as context or reference documentation for building characteristics and other geographic aspects of heritage.

G.I.S. POTENTIAL

The Section would benefit from the availability of a digital base map on which it could superimpose its thematic data. For the program assessment function, the Unit would like to access a variety of information from other sources such as environmental data for planning of areas in which to promote the BRIC Program.

The only generic procedure of a G.I.S. system that this Unit would use would be the point in polygon searches for determining the number of a particular building type within a certain area.

DATA SOURCE INFORMATION SHEET

TITLE: Heritage Data Base

SOURCE AGENCY: Ministry of Citizenship and Culture

PERSON: Mark Fram

TITLE: Conservation Officer

ADDRESS: 77 Bloor Street West
7th floor
Toronto, Ontario

PHONE: (416) 965-4490

DESCRIPTION: inventory of all grants handed out under the BRIC program

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	X		
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 12 grants

GROWTH RATE: unknown (24 pending)

DATA ITEMS: financial number, address of building, building type, architecture specific items

RETRIEVAL KEY(S): financial number

GEOCODE: address

DATE OF CREATION: 1982

FREQUENCY OF UPDATE: once a month

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: BRIC application forms

USERS OF INFORMATION: Heritage Branch for evaluation of BRIC program

VOLUME/FREQUENCY OF USE: minimal

ACCESS METHOD FOR USER: manual retrieval

AVAILABILITY: confidential

CHARGES: none

HARDWARE AND LOCATION: file cabinet, 77 Bloor Street W.

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

anticipating future automation on an IBM P.C.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Architecture

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS

		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Administer BRIC Grants	○	☐	☐	☐		☐	☐	☐							
	Program															

		CARTOGRAPHIC DATA																
		MANIPULATION / ANALYSIS																
		GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1	Administer BRIC Grants																	
	Program																	

		CARTOGRAPHIC DATA																				
		MANIPULATION / ANALYSIS											DISPLAY									
		DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION				
		SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Administer BRIC Grants																					
	Program																					

		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Administer BRIC Grants													
	Program													

4 CHIEF ELECTION OFFICE

4.1 OPERATIONS DIVISION

ORGANIZATION AND RESPONSIBILITIES

The Chief Election Officer administers the Election Act for the Province of Ontario for both provincial general elections and provincial by-elections.

The Chief Election Officer advises and supervises the returning officers, deputy returning officers and poll clerks in the performance of their duties associated with provincial general and provincial by-elections. The present encumbent is also Vice-Chairman of the Ontario Electoral Boundaries Commission (O.E.B.C.).

At present, there are 125 electoral districts in Ontario and it is anticipated there will be no less than 125 and no more than 130 electoral districts created by the new Representation Act. In general, electoral districts in Southern Ontario contain a population of approximately 70,000 or more, based on the last Canadian Census figures.

The rules for the creation of electoral districts are tempered by human judgment. The Commission determines the number of electoral districts and has discretion over the creation of boundaries of electoral districts based on the following criteria:

1. population based on the latest census figures (i.e., 70,000+ per electoral district),
2. accessibility or communication (e.g., topographic features and transportation routes associated with a given area),
3. existing boundaries of municipalities and wards,
4. traditional boundaries of electoral districts,
5. population trends,
6. characteristics of environment (e.g., differences in population density in urban and rural areas),
7. community or diversity of interests, and
8. special geographical considerations (e.g., rate of growth, spatial distribution, etc.).

Subsequent to a redistribution of the electoral district boundaries, each returning officer is responsible for dividing his electoral district into polling divisions. Provincial polling divisions are designed, to the extent practical, to conform to municipal polling divisions. An attempt is made to maintain between 250 and 350 voters in each polling division. A check is also made with the federal returning officer in order to maintain congruity with the federal polling boundaries where possible.

TASKS/SYSTEMS

1. Compilation of Electoral District Boundaries

Each returning officer submits a map or maps containing his recommendations for polling divisions within his electoral district for approval by the Chief Election Officer. These maps are maintained in the office of the Chief Election Officer for subsequent distribution, at cost, to anyone requesting them.

The Director of Operations is then responsible for compiling and correlating population data from published reports by Statistics Canada and the Statistical Services Branch, Ministry of Treasury and Economics in order to ensure that electoral district populations conform within reason to the suggested population count.

The Surveyor General of the Ministry of Natural Resources is responsible for the preparation of maps of each electoral district as well as for three index maps showing the provincial electoral boundaries. One of these index maps covers Northern Ontario, another Southern Ontario and the third Metropolitan Toronto.

OBSERVATIONS

In some cases, several maps are required by returning officers to display all of their polling subdivisions. These maps are often at different scales and of different accuracies and content.

FUTURE NEEDS AND WANTS

Correct legal descriptions of all electoral districts are desired.

Maps showing the federal, provincial and municipal polling division boundaries in distinguishing colours would be useful, as well as maps free from clutter showing only the major roads, municipal township boundaries, county boundaries, regional districts, the natural boundaries of the province and township names.

The Chief Election Officer also desires the ability to define and display proposed electoral districts on a digital map background to automatically ascertain the associated population.

G.I.S. POTENTIAL

Semi-automatic production of electoral and polling division maps would be beneficial to this Unit's activities.

An automated capability for selective display of electoral districts and subsequent retrieval of associated data would also be of considerable utility if G.I.S. capabilities were available.

DATA SOURCE INFORMATION SHEET

TITLE: Chief Election Officer & Ontario Electoral Boundaries Commission

SOURCE AGENCY: Chief Election Officer

PERSON: Warren Bailie

TITLE: Chief Election Officer

ADDRESS: 70 Lombard Street
Toronto, Ontario

PHONE: (416) 965-6831

DESCRIPTION:

FORMAT:

	M	A	MEDIA
MAP	x		maps
TABULAR	x		population
IMAGE			
TEXT			
LIBRARY			

NOTE: Surveyor General's Office responsible for producing*

SCALE: small scale Northern Ont., Southern Ont. & mun. of**

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: 125 to 130 electoral districts, 21,500 polling divisions

GROWTH RATE: tied to population growth

DATA ITEMS: population by last Canadian Census, transportation routes, topographic features, municipal boundaries, wards, electoral districts, population trends and densities

RETRIEVAL KEY(S): manual systems, individual electoral maps containing polling divisions stored in filing cabinet

GEOCODE: electoral district number, i.e. 1 to 125

DATE OF CREATION: -

FREQUENCY OF UPDATE: electoral boundaries every 10 years

COVERAGE/COMPLETENESS: Ontario-wide

SOURCE OF INFORMATION:

- Chief Electoral Officer for electoral districts
- Returning Officers for polling divisions
- Surveyor General for base maps and electoral boundary maps

USERS OF INFORMATION:

for Provincial General Election
" " By-elections

VOLUME/FREQUENCY OF USE: every 10 years

ACCESS METHOD FOR USER: manual, visit to files of Chief Election Officer

AVAILABILITY: on demand

CHARGES: at cost

HARDWARE AND LOCATION: N/A

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

could use a system for semi-automatic production of electoral and polling division maps and selective display of electoral districts and subsequent retrieval of associated data

*maps showing electoral district boundaries and for producing electoral boundary maps

**Metro Toronto and 125 electoral boundary maps

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Chief Electoral Officer

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

			TABULAR DATA							
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
AGENCY FUNCTIONS	1	Compilation of								
		electoral district								
		boundaries						◐		

			CARTOGRAPHIC DATA						
			GENERATION						STORAGE
			COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
AGENCY FUNCTIONS	1	Compilation of							
		electoral district							
		boundaries	◐			◐			◐

			CARTOGRAPHIC DATA																
			MANIPULATION / ANALYSIS																
			GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
			POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
AGENCY FUNCTIONS	1	Compilation of																	
		electoral district																	
		boundaries				□			□										

			CARTOGRAPHIC DATA										
			MANIPULATION / ANALYSIS										
			DIGITAL TERRAIN MODELLING									QUERY	
			SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
AGENCY FUNCTIONS	1	Compilation of											
		electoral district											
		boundaries										◐	◐

			CARTOGRAPHIC DATA									
			DISPLAY									
			COMPOSITION					PRESENTATION				
			QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
AGENCY FUNCTIONS	1	Compilation of										
		electoral district										
		boundaries						◐				

			IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
			COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Compilation of													
		electoral district													
		boundaries													

5 MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS

5.1 OVERVIEW

The purpose of the Ministry of Consumer and Commercial Relations is to ensure a fair, safe and honest marketplace. To achieve this, the Ministry regulates a wide variety of businesses through licensing, registration and inspection measures, and is involved in consumer education and protection.

To carry out this mandate a number of programs have been created. The programs relevant to this study are described below.

The objective of the **Property Rights Program** is to enable the ownership of and encumbrances affecting real property, as well as the encumbrances affecting personal property, to be readily determined. The program is responsible for the operation of the Personal Property Security Registration System located in Land Registry Offices throughout the province.

The **Registrar General Program** provides for the administration of the Marriage Act, and for the collection and custody of all records required under the Vital Statistics Act. The program supplies information and statistics to interested parties. Services include administration, issuance of certificates, recording of vital events and provision of statistical data.

The **Residential Tenancy Commission** administers the Residential Tenancies Act and provides information on landlord and tenant matters.

The **Technical Standards Program** works with private industry to develop standards for ensuring public safety in the areas of elevating devices, pressure vessels, flammable fuels and upholstered articles. The program also monitors the manufacturing and maintenance procedures of businesses and equipment within its jurisdiction, and issues licences for the operation of pressure vessels and elevators.

5.2 PROPERTY RIGHTS DIVISION
REAL PROPERTY REGISTRATION BRANCH

LAND REGISTRATION IMPROVEMENT PROJECT (POLARIS)

ORGANIZATION AND RESPONSIBILITIES

The Land Registration Improvement Project, also referred to as the POLARIS Project (Province of Ontario Land Registration and Information System), has the mandate to design, develop and implement improvements to the existing land registration system. It was created based on recommendations of the Ontario Law Reform Commission Report of 1971. The direction of the project was further enunciated under POLARIS specifications issued in 1979.

In essence, the design objectives of the POLARIS system require easier, less expensive, and quicker property-related transaction processing by the 65 regional titles offices located in Ontario. This system, if implemented, will eventually contain the 3,150,000 properties within provincial boundaries.

The project has been active for approximately four years. In the last two years, a two-phase (mapping and tabular data) pilot project has evolved. It is planned that an operational test will begin in late 1983 in Woodstock, Ontario and continue for one year.

The project organization has four subsections: Legal, Mapping System, Tabular System, and Operations. The project has a staff of approximately 28 people.

TASKS/SYSTEMS

1. Establish Legislation on Provincial Real Property Transactions

The Legal Section is responsible for proposing changes to existing real property transactions within the province. As these laws and regulations are crucial to the advancement of the project and must be proclaimed before POLARIS officially is implemented, it is important that they be understood. The Legal Section has already been responsible for the following legislation:

1) Reduction of the title search period provision to 40 years;

2) Changes to certification discharging procedures and responsibilities; and

3) Changes to certification procedures and simplification of registered plan survey processes.

In addition, statutes affecting the structures and content of real property transactions are being prepared for 1983/84 legislative approval.

Basically, the legal transactions are being reduced where possible to one-page documents to simplify and expedite real property transactions in Ontario. This effort is also providing a structure for the data input, because the terminal (soft copy) page format is being defined within the legislative submission.

In addition to the current effort to reduce documents into one-page (short form), the title search period is being proposed for further reduction to 25 years.

Indirectly, the proposed property legislation will reduce the residual backlog of transactions.

2. Prepare and Maintain Maps

The Mapping System Subsection is responsible for preparation and maintenance of two paper based maps (property indexes) for the purpose of showing spatial relationships between properties and for determining the parcel identification number. These maps serve as a reference source only and enable Land Registration Office staff and title searchers to visually identify properties and to cross-reference them with the parcel idenfication number and other common identifiers such as owner's name, street address, instrument number and assessment roll number. They then use the 9-digit (maximum) parcel identification number to specify property records contained in the POLARIS tabular system.

The two paper based map products are Block Index Maps and Property Index Maps.

a. Block Index Map

The Block Index Map is prepared by segmenting an area into contiguous blocks (not necessarily symmetrical grid units). The definition of each block is usually major roads or other delineating features such as rivers or railroads. Each block is then assigned a 5-character block identifier which is unique within the province. The block identifier is assigned ascending sequential numbers as each geographical block is identified for property mapping and processing by the POLARIS system. There is no coding built into the block identification. The 5-character identifier forms the prefix of the parcel identification number.

b. Property Index Map

Each block area defined above is further defined by a Property Index Map which shows major infrastructure elements, such as roads, waterways, railroads, major easements, the UTM grid, the interpreted property boundaries, and text. The map does not include property measurements (bearings and distances) or photogrammetrically interpreted structures. The data required to interpret property boundaries is obtained from recorded plans, title deeds, assessment maps and assessment rolls.

Each property within the block is assigned a 4-character parcel number. The parcel numbers are assigned sequentially and are not coded. The combination of block number and parcel number forms the unique parcel identification number which is a principal key of the POLARIS system.

The corners of each property are defined by a UTM co-ordinate. These co-ordinates are obtained or calculated from the most accurate sources available, which include:

- o direct ties to geodetic control and co-ordinate geometry,
- o indirect ties to geodetic control, e.g., via MTC's highway construction plans and co-ordinate geometry,
- o digitizing from OBM maps and transformations, and
- o digitizing from assessment maps.

Both the Block Index Maps and the Property Index Maps are created by and maintained on an Intergraph digital mapping system located in Mississauga and accessed by a work-station located at POLARIS offices. The property corner co-ordinates are calculated using an in-house developed co-ordinate geometry program and the Intergraph IGDS software, and then fed into the Intergraph system. The maps are produced on hard copy (paper) using a Calcomp 960 plotter.

All maps for a pilot project in Woodstock have been prepared and plotted.

The update frequency of the maps (new boundaries entered by POLARIS staff and hard copy maps sent to the Land Registration Offices) will be determined by the management of the Land Registration Office as there will be incurred cost. In the intervening period, which could be years (for rural areas), the staff at the Land Registration Office will manually draw the boundary changes on the Property Index Maps.

As a protection against litigation, each map contains a disclaimer relative to accuracy and the intended use of the map is defined.

The Mapping Section also supports the storage and retrieval of recorded plans on the Intergraph system. An example of a recorded plan is a reference plan which is identified as follows:

Registry Office Number	41
Transaction Type (Reference Plan)	R
Sequential Number	9999
Composite	41 R 9999

2. Storage and Maintenance of Tabular Information

The second systems related component of the POLARIS project is what we have referred to as the "tabular" system. It is a stand alone system in that it does not have a system supported bi-directional link to the mapping subsystem. Additionally, it runs on a different mainframe and with different software. The purpose of the Tabular System is to provide in digital format all nongraphical information currently available from the Land Titles Offices.

The Tabular Section staff have developed an on-line real time system from storing, maintaining and providing this information. The system is developed using PL/I, VSAM and CICS software.

The input formats, as mentioned earlier, are being specified within pending legislation as precise "short forms", which will simplify real property transaction processing as well as greatly facilitate computer handling.

The data elements are comprised of various codes, names and text which identify and describe the specific property. Currently, there are 11 transaction types which aggregate to approximately 200 unique "soft copy" system screens.

The "Main Element List" shows the following transactions that are either in operation or are being programmed:

Reference Number	Title
1	REGISTER DOCUMENT OF PLAN
2	ABSTRACT DOCUMENT OF PLAN
3	COLLECT AND RECORD FEES
4	EXAMINE AND CORRECT REGISTRATION
5	VERIFY/CERTIFY REGISTRATION
6	RULE OUT/DEREGISTER REGISTRATION
7	SEARCH PROPERTY INFORMATION
8	OPEN NEW PROPERTY
9	MAINTAIN PROPERTY RECORD
10	INDEX DOCUMENT IMAGES
11	REPORT STATISTICS

In addition, the following transactions have been researched and will be implemented in the future:

Reference Number	Title
12	REPORT BY GEOGRAPHIC AREA
13	MAINTAIN LIST FOR CREDITORS
14	OPEN/MAINTAIN USER ACCOUNTS
15	MAINTAIN SYSTEM TABLES
16	AUDIT SYSTEM
17	SEND MESSAGES
18	TEACH YOURSELF THE SYSTEM

The parcel identification number, as established in the Mapping System, serves as a primary retrieval key. The system can be accessed via IBM 3270 type terminals.

All data for a pilot project in Woodstock has been loaded by POLARIS staff at head office. The data loading (a relatively simple task using formatted screens) function has now shifted to the Land Titles Office in Woodstock.

3. Program Management and Operations

This Group will be responsible for the ongoing support of the POLARIS program. In this regard, activities such as site planning, training and so forth will be managed.

OBSERVATIONS

The POLARIS system is a positive step towards solving the many land-related information problems in Ontario.

The concepts document, which was produced 4 years ago, serves as the major guideline for the design of the POLARIS project. However, new management level personnel and new circumstances (including restricted funding) have changed the implementation design somewhat from the earlier theoretical design.

Required resources (including funding and staffing) for the POLARIS project have been difficult to obtain. This is, in part, due to the economic situation and the way in which the financial benefit accrual was initially specified and agreed upon. Additionally, staff reduction at the municipal level has indirectly affected the POLARIS project.

The Property Index Map does not indicate distances, bearings, structures, names or other data. The boundary corner co-ordinates are the product of a considerable amount of survey and photogrammetric analysis which is not shown on the Index Maps. It is unfortunate that the system does not selectively store and display these parameters for enhanced systems usage.

FUTURE NEEDS AND WANTS

The project desires to resolve problems caused by the absence of a single provincial co-ordinating and control authority for map-related activity.

The POLARIS project is planning various extensions to the "Level-1" system that is in development today. The following enhancements are currently being researched:

- Implementation of an instructional capability to allow the system to present user oriented procedures or explanations to the terminal operator on demand,
- The allowance for optional English or French (literal entries) to be used for data entry transactions and output report headings, and
- The programming of IBM-PC microcomputers to the input format specifications of the "Level-1" system and to put a number of these "micros" into Land Titles Offices for testing. Kent County has been designated as the second test area.

G.I.S. POTENTIAL

Assuming the legislation is passed to allow the Woodstock pilot to begin, it will almost certainly coincide (in terms of time) with the planned MNR pilot projects relative to digital mapping.

Consequently, it is recommended that the two pilot projects remain cognizant of each others' work but not attempt to impact the respective designs, scope or phasing. At a later time and as quantifiable systems performance indicators are established and assessed, it would be beneficial to compare results.

Automated G.I.S. capabilities would be beneficial in the preparation and maintenance of mapping products which use POLARIS data. Some of the procedures which are potentially useful include:

- map join/edge match capability in cartographic data generation,
- polygon overlay and buffering/corridoring to determine affected properties,
- polygon dissolve for aggregating and identifying common areas of concern, and
- a variety of manipulation and display capabilities which are currently being carried out as well, e.g., transformations, area/perimeter calculations, query/window, scale change, cosmetic enhancement, graphic superimposition, polygon mapping and text annotation.

DATA SOURCE INFORMATION SHEET

TITLE: MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS

SOURCE AGENCY: POLARIS - Tabular Data

PERSON: Andy Datlin

TITLE: Project Leader

ADDRESS: 10 Wellesley Street East
Toronto, Ontario
M7A 2J3

PHONE: (416) 963-0650

DESCRIPTION: Storage and retrieval of property related tabular data.

FORMAT:

			MEDIA
MAP			
TABULAR		X	Disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: N/A

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: Pilot test 6,000 properties

GROWTH RATE: Depends on approval of pilot test

DATA ITEMS:
-Parcel I.D.
-Assessment Roll Number
-Other property data items

RETRIEVAL KEY(S): Parcel I.D.

GEOCODE: UTM co-ordinates

DATE OF CREATION: 1982

FREQUENCY OF UPDATE: Ongoing after system is operational

COVERAGE/COMPLETENESS: Woodstock - pilot province-wide eventually

SOURCE OF INFORMATION: Registry and Land Titles Offices

USERS OF INFORMATION:
-Surveyors
-Lawyers
-Public at large

VOLUME/FREQUENCY OF USE: Unknown until project is operational

ACCESS METHOD FOR USER: On-line terminal

AVAILABILITY: Available to all users

CHARGES: Varies by transaction type

HARDWARE AND LOCATION: IBM at Queen's Park

SOFTWARE: VSAM/CICS

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS

SOURCE AGENCY: POLARIS - Mapping and Data

PERSON: Ray Scott

TITLE: Project Leader

ADDRESS: 10 Wellesley Street East
Toronto, Ontario
M7A 2J3

PHONE: (416) 963-0650

DESCRIPTION: Storage and retrieval of property maps

FORMAT:

	M	A	MEDIA
MAP		x	disc/Intergraph
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: Variable

ACCURACY/RESOLUTION: Variable

SIZE/VOLUME: Pilot test maps for 6,000 properties

GROWTH RATE: Depends on approval of pilot test

DATA ITEMS:
-Parcel I.D.
-UTM co-ordinates

RETRIEVAL KEY(S):
-Map sheet no.
-UTM co-ordinates

GEOCODE: UTM co-ordinates

DATE OF CREATION: 1982

FREQUENCY OF UPDATE: Ongoing after system is operational

COVERAGE/COMPLETENESS: Woodstock - pilot
Province-wide eventually

SOURCE OF INFORMATION:
-Assessment maps
-Legal Descriptions

USERS OF INFORMATION:
-Surveyors
-Lawyers
-Public at large

VOLUME/FREQUENCY OF USE: Daily

ACCESS METHOD FOR USER: At Registry and Land Titles Offices

AVAILABILITY: Available to all users

CHARGES:

HARDWARE AND LOCATION: Intergraph (computer located at Mississauga)

SOFTWARE: Intergraph

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS

POLARIS

LEGEND:
○ MANUAL PROCESS
◉ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA							
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1 Preparation and Maintenance of Maps								
2 Storage and Maintenance of Tabular Data	○	●	●	●	●		●	●

AGENCY FUNCTIONS	CARTOGRAPHIC DATA						
	GENERATION						STORAGE
	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Preparation and Maintenance of Maps	○	●	●	●	◉		◉
2 Storage and Maintenance of Tabular Data							

AGENCY FUNCTIONS	MANIPULATION / ANALYSIS													
	GEOMETRIC ANALYSIS													
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Preparation and Maintenance of Maps	◉		□	●	●	□	●				◉			
2 Storage and Maintenance of Tabular Data				◉										

AGENCY FUNCTIONS	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Preparation and Maintenance of Maps														
2 Storage and Maintenance of Tabular Data														

AGENCY FUNCTIONS	DISPLAY									
	COMPOSITION					PRESENTATION				
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Preparation and Maintenance of Maps	◉		●	●	●	●				◉
2 Storage and Maintenance of Tabular Data										

AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Preparation and Maintenance of Maps													
2 Storage and Maintenance of Tabular Data													

5.3 REGISTRAR GENERAL DIVISION BIRTH, DEATH AND MARRIAGE CERTIFICATES SECTION

ORGANIZATION AND RESPONSIBILITIES

The Registrar General's Office is responsible for registering and recording Ontario births, deaths, marriages and still-births. It also keeps adoption, divorce and name change records. Under the Marriage Act, the Registrar General's Office issues certificates of registration to people authorized to perform marriages in Ontario.

The Registrar General's administrative staff totals approximately 130 at head office, and approximately 900 people are employed by division registrars throughout the province.

A computerized data base has been developed by in-house staff to assist in carrying out the above mandate. The software runs on an IBM 3033 residing at Queen's Park Computer Centre.

TASKS/SYSTEMS

1. Issue Certificates

The Registrar General's Office and division registrars receive over-the-counter requests for certificates for birth, death and marriage previously registered. This request is made on a preprinted form. These forms are then forwarded to the head office processing centre where the requests are input into a computer via CRT terminals and computer printed certificates are produced. In the fiscal year 1982/83, 335,046 certificates were issued.

2. Process Registration Forms

An official registration form is submitted to the head office processing centre by appropriate authorities. The legal requirements, i.e., existence of official signatures, are checked. An appropriate geocode is assigned to each registration, and data is then loaded into the computer.

The geocoding is a unique number assigned to each of the 93 "schedules" or territorial entities covering Ontario, each comprising numerous townships and/or parts of townships. The boundaries of these schedules are very irregular and were defined approximately 60 years ago. The purpose of these schedules is to aggregate statistics by geographic areas defined by the schedule boundaries.

3. Publish Statistics

Every year, the Registrar General's Office produces a publication entitled "Province of Ontario, Vital Statistics for 19..". This is produced by a report generator program accessing the data base.

OBSERVATIONS

The computer system has been in use for approximately one year and is both effective and efficient. Unlike most other large data bases, this data base does not use a commercial DBMS.

The boundaries of the "schedules" of the geocoding system are independent and do not correspond to federal census tracts, district health council boundaries or political units.

FUTURE NEEDS AND WANTS

The Section would like to establish a better geocoding system, whereby data aggregated by geographic areas can be correlated with data collected by other agencies. For example, the Section would like to correlate the number of cancer deaths in a given polygon with chemical waste dump sites within the same polygon, and so forth.

G.I.S. POTENTIAL

A pilot project would be beneficial to define a new geocoding system, load statistics in a given area and correlate this data with data from other sources using G.I.S. functions. Some of the procedures which would be useful include polygon overlay, polygon mapping and annotation of text.

DATA SOURCE INFORMATION SHEET

TITLE: MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS

SOURCE AGENCY: Registrar General - Births and Deaths

PERSON: Dale DeMarsh

TITLE: Manager, Registration of Vital Events

ADDRESS: Macdonald Block
Queen's Park
Toronto, Ontario

PHONE: (416) 965-2274

DESCRIPTION: Recording and issuing of certificates

FORMAT:

	M	A	MEDIA
MAP	x		paper
TABULAR		x	disc/tape
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: Map at 1:500 000

ACCURACY/RESOLUTION:

SIZE/VOLUME: Not available

GROWTH RATE: Approx 121,000 births/year
70,000 marriages/year

DATA ITEMS: Names, dates, residences, etc.

RETRIEVAL KEY(S): -Social Insurance no.
-Name

GEOCODE: Schedule (geographic area defined by Registrar General on map)

DATE OF CREATION:

FREQUENCY OF UPDATE: On-going

COVERAGE/COMPLETENESS: Province-wide

SOURCE OF INFORMATION: Registrar Offices

USERS OF INFORMATION: Most Governmental Agencies

VOLUME/FREQUENCY OF USE: 335,000 input transactions/year
-49,000 output certificates/year

ACCESS METHOD FOR USER: Visit Macdonald Block or other Registrar Offices

AVAILABILITY: On demand

CHARGES: Varies

HARDWARE AND LOCATION: IBM hardware at Queen's Park

SOFTWARE: In-house developed

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: MINISTRY OF
CONSUMER AND COMMERCIAL
RELATIONS

-Registrar General

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
◉ AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Issue Certificates	○	●					●	●
2	Process Registration								
	Forms	○	●	●	●	●	●	●	●
3	Publish Statistics	○						●	●

AGENCY FUNCTIONS		CARTOGRAPHIC DATA						
		GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Issue Certificates							
2	Process Registration							
	Forms							
3	Publish Statistics							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Issue Certificates														
2	Process Registration														
	Forms														
3	Publish Statistics	□			□										

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Issue Certificates														
2	Process Registration														
	Forms														
3	Publish Statistics														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Issue Certificates										
2	Process Registration										
	Forms										
3	Publish Statistics						□				□

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Issue Certificates													
2	Process Registration													
	Forms													
3	Publish Statistics													

5.4 RESIDENTIAL TENANCY COMMISSION RENT REVIEW SECTION

ORGANIZATION AND RESPONSIBILITIES

The Residential Tenancy Commission's responsibility is to administer the Residential Tenancies Act and to provide information on landlord and tenant matters. Currently, the Commission administers those portions of the Residential Tenancies Act that deal with rent review.

Under this Act, rent increases are limited in amount and frequency. The frequency is once per year and the amount on certain rental accommodations is restricted to 6% per year. The Commission approves/disproves requests from landlords for rent increases higher than that stipulated in the Act.

Rent review applies to rental houses, apartments, townhouses, rooming houses, mobile homes and sites. Certain non-profit or government-owned rental housing, new units not rented prior to January 1, 1976, and units where the rent is $750.00 or more per month are exempt from rent review.

The Commission has approximately 200 personnel and 20 offices throughout Ontario.

TASKS/SYSTEMS

1. Respond to Enquiries

The Residential Tenancy Commission is often called upon to provide statistics to the public and other government agencies who become involved, e.g., Attorney General (in the case of human rights violations), county courts (in the case of eviction processing). In 1981/82 the number of enquiries were:

Evictions	20,738
Condition of premises	14,506
Tenancy agreements	26,067
Other	17,179
Total	78,490

2. Conduct Rent Review

Each rent review case is different. Dependent upon the number of impacted tenants, the proposed increase, the accompanying financial analysis (the vehicle the landlord uses to state his case for increased rents), and the emotion and political will of the tenants, the rent reviews may be settled quickly or may eventually use all the legal processes made available by law.

In the evolution of many rent review cases, the Commission obtains substantial quantities of property-related data, usually on file with municipal and provincial level governments. The following types of information become part of the rent review analysis:

o Land Titles	Who owns the property, dates of purchase, status of any liens, etc.
o Property Assessment	Descriptions, assessed values, dates of major renovations, dates apartments were occupied, past mill rates, etc. Comparative data of other apartments in the vicinity are sometimes required.
o Zoning/Planning	Pending changes in the geographical area.
o Companies Data	If owned by registered companies, who are the company officers and shareholders and other property holdings.
o Municipal Data	Future mill rate projections.

Obviously, the accuracy and availability of the information varies with each locale. To compensate, field visits are often required to substantiate differences between government data and the data submitted by landlords.

In 1981/82 the Commission responded to 190,977 rent review enquiries and conducted over 5,000 rent review hearings. The Commission has a microcomputer system that supports some of its statistical and administrative requirements.

OBSERVATIONS

Like many regulatory government agencies, the operating environment of the Residential Tenancy Commission tends to be reactive, particularly, since its staff level has fallen from 800 to 200.

The Commission is not a supplier of base information. However, it is a user of large amounts of data from others. As such, it is at the mercy of coding classifications established by other organizations.

FUTURE NEEDS AND WANTS

The impact on agencies such as the Residential Tenancy Commission could be significant in terms of ability to respond (less time) for processing rent review. Computer access to information from other sources for analysis would be a benefit.

G.I.S. POTENTIAL

The Commission could effectively use a data base of rental accommodation in Ontario and rent review cases by geographic area. A pilot project to acquire zoning, assessment and land titles data via computer directly from associated data bases would be an asset.

5.5 TECHNICAL STANDARDS DIVISION
FUELS SAFETY BRANCH

ORGANIZATION AND RESPONSIBILITIES

The mandate of the Fuels Safety Branch is defined in the Provincial Energy Act of 1971, the Gasoline Handling Act of 1979 and five subordinate provincial regulations. The Branch is responsible for establishing safety standards as they relate to hydrocarbon fuel transportation, storage, and utilization in Ontario. In conjunction with the policy function, they are also responsible for insuring compliance with those policies by both commercial and residential users. Hydrocarbon fuels include gasoline, natural gas, propane and fuel oil.

The associated administrative functions such as contractor certification and fuel storage licensing are also within their domain. The Branch has a staff of 63, of which 32 are in field locations throughout the province.

TASKS/SYSTEMS

There are two general classifications of branch activities. They are fuel safety standards and enforcement, and testing, licensing and registration.

1. Prepare and Enforce Fuel Safety Standards

This task involves the following steps:

a. Review and approval of proposed national fuel safety standards for implementation in Ontario.

b. Where unique or more stringent safety standards are required, the Branch formulates policy and submits it for approval. These standards become the basis for applicable provincial statutes, regulation or amendments that are structured and promulgated by Ministry's legal staff.

c. Ensure construction involving projects such as natural gas pipelines, gasoline storage tank farms, retail propane outlets, gas/propane conversion enterprises, and gasoline stations meet the prescribed standards.

d. Scheduled and non-scheduled inspection of construction sites involving hydrocarbon fuel distribution, storage and/or utilization.

e. Periodic inspection (as defined by law) of commercial enterprises involved with hydrocarbon fuels.

f. Review of reported accidents causing personal injury or property damage and issuance of a formal report on the cause. Gasoline storagetank leakage, natural gas pipeline explosions and fires are examples of incidents requiring investigation.

No automated systems exist within the Fuels Safety Branch for supporting the steps identified above.

The Branch depends on two major sources of information for this task. Utility companies such as Consumer Gas and Union Gas supply the necessary map and tabular data in conjunction with construction plans, accident reports, and so forth. Municipal government agencies supply data such as land titles, property assessment, utilities (Kitchener Gas), police records, safety inspections, and so forth.

Provincial law requires that information be made available for the Fuels Safety Branch at no cost to the government. However, due to incompleteness and varying standards (zoning variances, environmental status, etc.), and the accuracy and scale of maps, this regulatory agency is obliged to make numerous field visits to confirm data accuracy. This takes time and resources.

2. Testing Licensing and Registration

The Fuels Safety Branch also provides an administrative and control function relating to contractor certification, facility licensing and qualification testing.

	Annual Items Processed
- Contractor Certification	7,000
- Facility Licensing*	12,000
- Qualitification Testing (individuals)	36,000
	55,000

---

*The major elements are gas stations (8,400) and propane retailers (2,000).

These activities involve testing, certification and, where necessary, annual renewal processing. The Department contains an accounts receivable section and issues certificates as prescribed by law. The revenue from these transactions amounts to approximately $1,100,000 per year.

A Wang computer system is currently being implemented to support the administrative segment of the Branch's mandate.

OBSERVATIONS

The Fuels Safety Branch relies primarily on the municipalities and utility companies for required map and tabular data. Scale, accuracy, and completeness vary with the source of data.

FUTURE NEEDS AND WANTS

In the long term, the potential for the Fuels Safety Branch will evolve from MNR's ability to first work with the suppliers of the Fuels Safety Branch data base, the municipalities and the utility companies. Provided that the principal suppliers of land-related data can work together, the users of such data, e.g., the Fuels Safety Branch should be able to enhance productivity and substantially reduce certain types of expenditures.

G.I.S. POTENTIAL

Digital maps showing locations of gasoline stations, propane outlets and natural gas distribution systems could be used by the Fuels Safety Branch very effectively for carrying out their tasks.

6 MINISTRY OF THE ENVIRONMENT

6.1 OVERVIEW

The Ministry of the Environment is responsible for maintaining a high level of quality of the environment including air, water and land. The Ministry is responsible for the protection of human health and the ecosystem against negative environmental influences. The Ministry is comprised of four divisions: Finance and Administration, Intergovernmental Relations and Strategic Projects, Environmental Planning, and Regional Operations. The organizational structure is depicted in **Figure 6.1-A** which follows.

The two divisions of particular relevance to the User Needs Study are the Environmental Planning and Regional Operations Divisions, described below.

The **Environmental Planning Division** is responsible for developing policies, plans and programs to ensure high standards of air, surface and ground water, and drinking water quality. The Division must also develop policies, plans and programs for waste management. The Division is divided into a number of branches in order to fulfill its mandate. The relevant branches addressed in this study are the Air Resources Branch, Laboratory Services and Applied Research Branch, the Waste Management Branch, and the Water Resources Branch.

The **Regional Operations Division** must enforce regulations, control emissions and establish abatement programs. This Division must deliver programs to maintain a high level of environmental quality for air, water and land. The branch of interest for the User Needs Study is the Environmental Approvals and Project Engineering Branch, which enforces environmental standards through the issuance of special permits and licences.

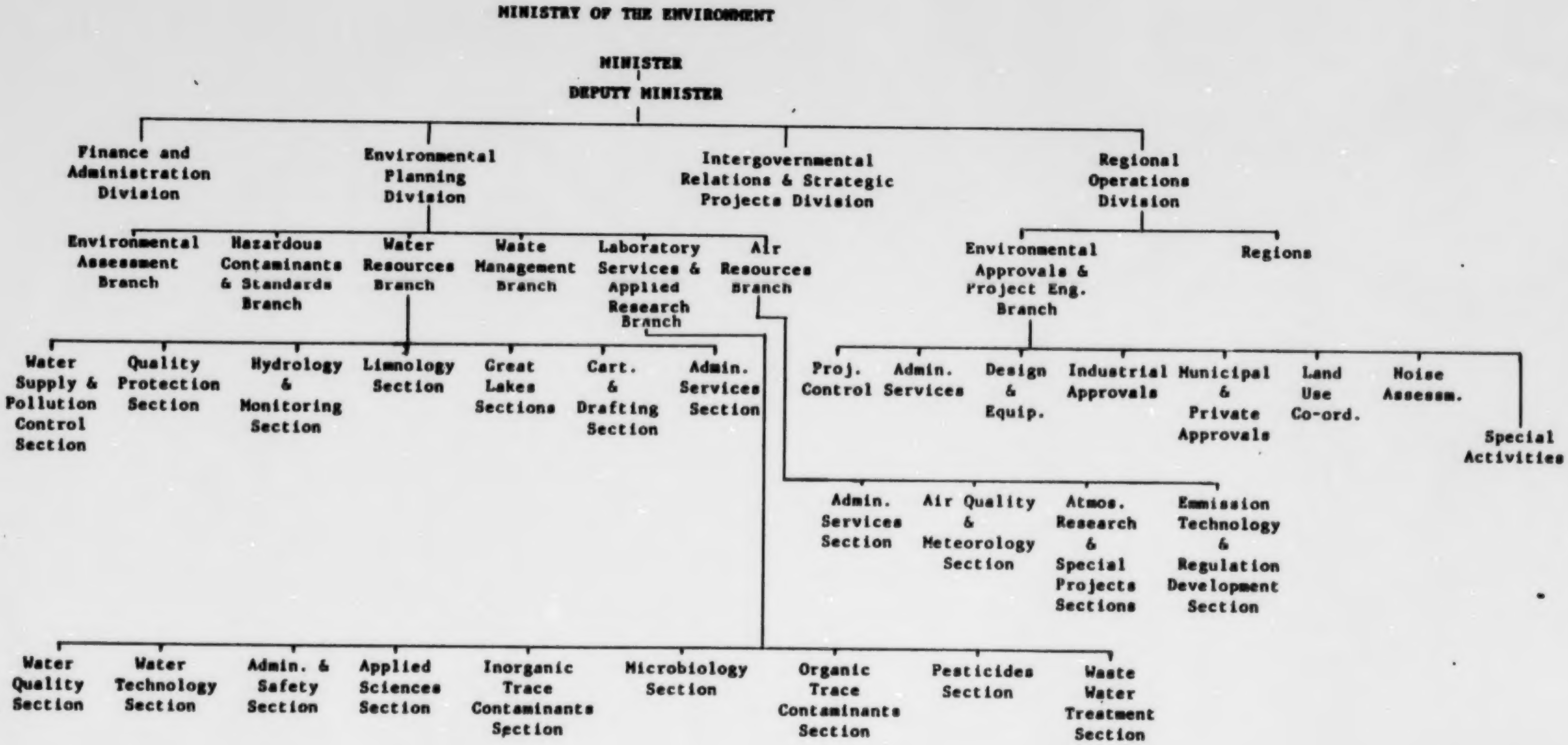

MINISTRY OF THE ENVIRONMENT
MINISTER
DEPUTY MINISTER
Finance and Administration Division
Environmental Planning Division
Intergovernmental Relations & Strategic Projects Division
Regional Operations Division
Environmental Assessment Branch
Hazardous Contaminants & Standards Branch
Water Resources Branch
Waste Management Branch
Laboratory Services & Applied Research Branch
Air Resources Branch
Environmental Approvals & Project Eng. Branch
Regions
Water Supply & Pollution Control Section
Quality Protection Section
Hydrology & Monitoring Section
Limnology Section
Great Lakes Sections
Cart. & Drafting Section
Admin. Services Section
Proj. Control
Admin. Services
Design & Equip.
Industrial Approvals
Municipal & Private Approvals
Land Use Co-ord.
Noise Assessm.
Special Activities
Admin. Services Section
Air Quality & Meteorology Section
Atmos. Research & Special Projects Sections
Emmission Technology & Regulation Development Section
Water Quality Section
Water Technology Section
Admin. & Safety Section
Applied Sciences Section
Inorganic Trace Contaminants Section
Microbiology Section
Organic Trace Contaminants Section
Pesticides Section
Waste Water Treatment Section

Figure 6.1-A

6.2 ENVIRONMENTAL PLANNING DIVISION

6.2.1 AIR RESOURCES BRANCH
AIR QUALITY AND METEOROLOGY SECTION
AIR QUALITY AND METEOROLOGICAL INFORMATION SYSTEM
AIR POLLUTION EMISSION INVENTORY SYSTEM

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Air Resources Branch is to protect the health and well-being of the citizens of Ontario from air pollution. The primary mandate of the Air Quality and Meteorology Section is to provide to the Ministry of the Environment and the public comprehensive knowledge of air quality in the province. Their responsibilities entail determining the air quality in the province, which is achieved through analysis and modelling of air quality measurements, and preparing publications.

Until 1968, air pollution control was a responsibility of individual municipalities in the province. The Provincial Air Pollution Control Act of 1967 made pollution control a provincial responsibility on January 2, 1968. This move was taken because of the inability of some municipalities to afford comprehensive air pollution programs or due to the fact that some municipalities did not really consider air pollution control a priority issue.

The primary responsibilities performed by the Section staff of approximately 30 in the central office are to analyse, interpret, and maintain the air quality, meteorological, and air pollutant emissions data and carry out air quality assurance measures. The staff of 40 to 50 personnel located in the regional offices are responsible for operating and maintaining air quality measuring stations as well as obtaining emission measurements and enforcing legislation with respect to air pollution.

Users of the data collected, analysed and maintained by this Section, include Environment Canada and various research institutes to investigate the effects of air pollution on health and environment; the Ministry of Labour to study the effects of air pollution on workers in localized environment; the Ministry of Transportation and Communications, for planning the locations of highways; and the planning departments of municipalities which may use the data when zoning areas for particular land uses such as residential or industrial. In this regard, the recorded pollution levels in an area may play a role in determining the use of the land and corresponding by-laws. The planning department of the City of Toronto has published a report describing how air pollution data is utilized in the planning process. Finally, the Air Resources Branch makes available air pollution data to the public through various publications.

TASKS/SYSTEMS

1. Collect, Analyse and Maintain Air Quality Information

Since the province assumed the responsibility for air pollution within Ontario, the number of air quality measuring stations has increased from a relatively low number in the late '60s to 250 stations which presently operate. Of the 250 stations, 147 are automated and continuous, 28 of which are tied directly into the central office via telemetry. The observations from these 28 stations are recorded on magnetic tape in the field and listed on computer output in head office.

Since the mid-1970s, the measuring stations have operated on a regionalized network basis. At approximately the same time, the federal government also became involved in pollution control data measurement and analysis. The federal government provided the various provinces with the money and equipment needed to establish pollution control measuring stations. In return, the provinces provide the federal government with the observations recorded at these stations. This information is sent to the federal government on magnetic tape.

The data collected at the air quality measuring stations not linked via telemetry, is automatically recorded on paper tape or recording charts. This data is validated in the regional offices and then sent to the central office in Toronto where Section personnel digitize the information from the recording charts. This information goes onto magnetic tape which is then sent to the Computer Centre at Downsview and input to the Air Quality and Meteorological Information System. Data that is received by the central office via telemetry from the other 28 stations is input to this central air quality and meteorological information system.

Air samples are also taken at the air quality measuring stations which are sent to laboratory for analysis. The results from this analysis are input to the Central Air Quality and Meteorological Information System in Downsview.

The data within the data files of this system and the results from the modelling programs, statistical analysis and laboratory analysis are available through listing via computer output and in hard copy and microfilm publications distributed by the Ministry. The latest publication was for the year 1980. The reason for the time-lapse in publications is due to the length of time required to carry out the laboratory analysis on the air samples. There are no charges for the publications obtained through the central office. At present, approximately 200 people are on the mailing list to receive these publications. These include universities, industrial organizations such as Ontario Hydro, public libraries and the Medical Officers of Health in the various municipalities.

Data manipulation through the use of the modelling programs and statistical analysis is routinely carried out on the data within the system. A list of the Air Quality System Analysis Programs is contained in the Appendix. Most of the modelling programs have been either developed in-house or by consultants.

To enhance their air quality analysis capabilities, this Section has access to meteorological data available through the Meteorological Data Acquisition System (MDAS). This consists of meteorological data for North America collected by Environment Canada and sent to this Section via CNCP Data Transmission Lines. The data is stored on a Data General Eclipse computer. The Section has access to this data via a Hewlett-Packard graphics terminal.

This meteorological data can be superimposed on a digital map of North America which is displayed on the Hewlett-Packard graphics terminal screen. The Section personnel are then able to relate air quality data to such items as wind direction which is graphically displayed on the terminal screen. At present, there is no direct link between the two data file systems.

It is estimated that there are several million air quality measurement records stored in the system located at Downsview with 2 to 3 million updates to these records performed annually. Central office personnel have access to this data through several IBM 3278 terminals. The regional offices also have access to this data located in Downsview by computer listing, which is sent to them or by accessing the data via their Data Point minicomputers. These minicomputers have 64K of main memory and 11 megabytes of disc storage. The regional offices have the ability to query the data files and have the air quality information which they require downloaded to their system. The regional offices also have the capability to do some analyses and modelling on this data. However, for the larger projects which require modelling of the air quality data on a regional level, this is carried out in the central Toronto office.

OBSERVATIONS

Maps are used to a certain extent by the regional offices to plot the location of the air quality measuring stations for inventory purposes and for public information. The reports that are published by the Section also contain small scale maps which show the general location of the measuring stations.

Reports that are available either through computer listing or the publications, may contain data other than that previously listed, such as the pollutant types, the amount of pollutant measured at the stations and the location of the stations identified by UTM co-ordinates.

The central office staff, in addition to analysing and maintaining the data in the data files of the air quality information system, are also responsible for carrying out calibration checks of the 147 air quality measuring stations. They also carry out calibration checks of those stations which are operated by organizations outside of the Ministry such as Ontario Hydro. This is to ensure that the data received by this Section from all sources is reliable.

To aid in the analysis of the air quality measurement data, this Section utilizes business graphs and charts that can automatically be produced as a result of certain analysis. An example of the type of plots that are produced include time versus pollution concentration measurements.

2. Collect, Analyse and Maintain Pollution Emission Data

The Air Pollution Emission Inventory System was started in approximately 1968. This program involves the gathering, storing and analysing of pollution emission data that is obtained from the chimneys of industries and large residential complexes. In addition to obtaining air pollution emission data from industries and residential areas, data is also obtained on an area basis from the emission of pollution from cars.

The largest component of this particular program involves the measurement of pollution emission from chimneys. The regional offices are responsible for sending questionnaires to individual companies and large residential complexes such as apartments, which are then completed and returned to the regional offices. The personnel of the regional offices then visit the individual companies and apartments to ensure that the data received is correct. Once this validation has been carried out, the information is entered into the Air Pollution Emission Inventory Data files which reside in the computers located at the Downsview Computer Centre. If a company wishes to change the pollution emission levels produced by that firm, an application must be filled out and processed through the regional offices.

The automated storage of this data began in 1974. At present, several million sequential records reside in the system and are updated on a continuous basis. There are two categories of information stored in this system. The first category involves pollution emission by area for car emissions, while the second category involves pollution emission from point sources such as chimneys. The data for particular areas is recorded against a 1 sq. km UTM grid in residential areas. This data is also aggregated to fit a census tract. The other category of data, the point source data, is also recorded through the use of UTM co-ordinates. These co-ordinates are accurate to within 100 m and identify the particular industry or company rather than the individual chimney involved.

The data within this system can be accessed through the use of terminals located at the head office in Toronto. Computer generated reports are also produced. There are three main methods of listing the data: by date, type of pollutants and emission source location. The data can also be sorted by UTM grid, name of firm, and address of firm for locations in Toronto. It should be noted that the UTM grids are identified by the use of an eight-digit UTM co-ordinate value consisting of four northing and four easting co-ordinate digits, and this area location capability has only been established for the areas of Toronto and Hamilton.

The head office of this Section carries out statistical analysis and utilizes the emission data in its various modelling programs. The regional offices do not have on-line access to this data. Rather, they are provided with computer generated listings of the information contained in the pollution emission data files. Although the regional offices have access to all the data, the public only has access to a certain portion of it, since some of the data is considered confidential.

In addition to the statistical analysis and modelling programs that this Section uses, it also has the capability to produce contour maps of pollution emission concentrations for the areas of Toronto and Hamilton. It is for these two locations that the 1 sq. km grids have been digitized.

OBSERVATIONS

There is no computer link between the Air Quality and Meteorological Information System and the Air Pollution Emission Inventory System. Some comparisons are made between the data in the two files for some projects. For example, the Section personnel may want to verify the air quality data in a particular area by the pollution emission data for that same area.

There is also no computer link between the Meteorological Data Acquisition System and the other two data filing systems maintained by this Section.

FUTURE NEEDS AND WANTS

This Section has been in existence for some time now and it appears that growth in terms of the number of air quality measuring stations has levelled off. To this end, many of the point source locations have also been identified and entered into the system for the Pollution Emission Control System. In addition, the supervisor has mentioned that much of the equipment and programs required to carry out the analysis of air quality and pollution emission data is already in place and operational. No land-related needs and wants were identified by this Section.

G.I.S. POTENTIAL

The air quality and pollution emission data is referenced by either UTM co-ordinates for air quality measuring stations or point sources of pollution emission and by UTM grid for pollution emission by area. The referencing of pollution emission data by grid is only available for the area of Toronto and Hamilton at this time.

The fact that the information is referenced by UTM co-ordinates provides the possibility of transferring this data to other organizations that may make use of it. In particular, Ontario Hydro may be interested in utilizing this data in conjunction with its Computer Aided Route and Site Selection program (CARSS) which is also based on a UTM grid system for possible locations of coal fired electric generating plants.

This Section also has use for a digital topographic data base to correlate data such as air quality stations or point source emissions with land forms. At present, this Section is producing some digital contour maps for pollution emission concentrations for the areas of Toronto and Hamilton. The availability of a digital OBM map may facilitate the plotting of additional point source and area data by this Section.

The potential availability of G.I.S. software capabilities could be useful for automating some of the Section's activities. In regard to handling air quality information, some useful automated capabilities would include proximal and contiguity analyses, and point mapping with annotation of text. For pollution emission data management, point in polygon searches would be a useful automated tool. For both of those tasks, the ability to conduct automated queries of the data bases for particular data would be a new and useful tool.

DATA SOURCE INFORMATION SHEET

TITLE: Air Quality Information System

SOURCE AGENCY: Ministry of the Environment
PERSON: L. Shenfeld
TITLE: Supervisor Air Quality and Meteorological Section
ADDRESS: 880 Bay Street
4th Floor
Toronto, Ontario
PHONE: (416) 965-0689
DESCRIPTION: an inventory of daily air quality records for the 147 air quality stations

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: millions of records

GROWTH RATE: tens of thousands of records annually

DATA ITEMS: region (MOE), station number (assigned by MOE), station name, station location (by UTM co-ordinates), elevation of site, air intake, pollutant level (i.e. for sulphur dioxide, carbon monoxide, etc.)

RETRIEVAL KEY(S):

GEOCODE: UTM co-ordinates, MOE region

DATE OF CREATION: 1968

FREQUENCY OF UPDATE: 147 records daily

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: readings from air quality stations

USERS OF INFORMATION: internal to Ministry of the Environment, Ontario Hydro, private industry, public, MNR, universities, libraries, municipalities

VOLUME/FREQUENCY OF USE: continual use daily

ACCESS METHOD FOR USER: via reports generated or terminal linked to IBM at Downsview

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: IBM 370/168, Downsview, Ontario

SOFTWARE: see Appendix

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: Pollution Emission System

SOURCE AGENCY: Ministry of the Environment
PERSON: L. Shenfeld
TITLE: Supervisor Air Quality and Meteorological Section
ADDRESS: 880 Bay Street
4th Floor
Toronto, Ontario
PHONE: (416) 965-0689

DESCRIPTION: an inventory of emissions from industrial and highrise chimneys and area pollution due to automobiles

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: millions of records

GROWTH RATE: very small

DATA ITEMS: census area, emission class, quantity of emission, level of emission for pollutant, company name and address, temperature of emission and other confidential information, UTM grid cell, confidential information regarding company

RETRIEVAL KEY(S):

GEOCODE: census area, UTM grid cell, address

DATE OF CREATION: manual 1970, automated 1974

FREQUENCY OF UPDATE: as required by a change in emissions, fairly infrequently

COVERAGE/COMPLETENESS: in detail for 12 municipalities, generally for 50 municipalities

SOURCE OF INFORMATION: questionnaires completed by industries, field survey by MOE staff

USERS OF INFORMATION: municipalities, MOE, MNR, private industry, public

VOLUME/FREQUENCY OF USE: several queries daily

ACCESS METHOD FOR USER: via terminal or phone

AVAILABILITY: restricted, some information is confidential

CHARGES: none

HARDWARE AND LOCATION: IBM 370/168, Downsview

SOFTWARE: see Appendix

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

AIR QUALITY AND METEOROLOGICAL SECTION

AIR QUALITY INFORMATION SYSTEM

POLLUTION EMMISSION SYSTEM

LEGEND:
- ○ MANUAL PROCESS
- ⊕ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

	AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Collect, Analyse, &	●	●	●	●	●	●	●	●							
	Maintain Air Quality															
	Information															
2	Collect, Analyse, &	●	●	●	●	●	●	●	●	●	●		⊕			
	Maintain Pollution															
	Emmission Data															

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA																
		MANIPULATION / ANALYSIS																
		GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1	Collect, Analyse, &									⊕					⊕			
	Maintain Air Quality																	
	Information																	
2	Collect, Analyse, &				⊕													
	Maintain Pollution																	
	Emmission Data																	

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA																				
		MANIPULATION / ANALYSIS											DISPLAY									
		DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION				
		SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Collect, Analyse, &										☐	☐	●		●		●		⊕			⊕
	Maintain Air Quality																					
	Information																					
2	Collect, Analyse, &		⊕								☐	☐						⊕			●	
	Maintain Pollution																					
	Emmission Data																					

	AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Collect, Analyse, &													
	Maintain Air Quality													
	Information													
2	Collect, Analyse, &													
	Maintain Pollution													
	Emmission Data													

6.2.2 LABORATORY SERVICES AND APPLIED RESEARCH BRANCH
WATER QUALITY SECTION
LABORATORY INFORMATION SYSTEM (LIS)

ORGANIZATION AND RESPONSIBILITIES

This Branch is responsible for carrying out a variety of tests pertaining to water, sewage, industrial waste, air, vegetation, sediment and soil, dustfall, biomaterial, and other subjects. In order to facilitate the work carried out on approximately 1,500,000 tests, the Laboratory Information System (LIS) was developed. The LIS is an analysis management tool residing on an HP 3000 located at the Laboratory Branch facility. In particular, the LIS is utilized:

1. to keep track of the sample submissions in the laboratory complex and to provide status reports during the tests carried out on the samples;

2. to operate as a work scheduling system used to inform the technicians as to what tests have been carried out and what tests must be carried out for each sample; and

3. to provide a test result summary report which is returned to the regional offices or organizations from which the samples were received.

TASKS/SYSTEMS

1. Maintain LIS

When a sample from a quality sampling station, water facility or sewage treatment plant is received, a submission form is completed and the submission data entered into the LIS. Each sample to be tested is assigned an internal identification code. Throughout the sample testing process, the internal code is utilized to identify that particular sample. This internal code provides a unique identifier, since the location codes used by the water treatment plants, sewage plants and the water quality sampling stations are all different.

Up to 300 or 400 individual tests can be carried out for each sample. As the tests on the samples are completed, the results are entered into the LIS. Due to the large number of tests that may be carried out for the individual samples, the LIS keeps track of whether or not certain tests have been carried out. As needed, the technician can enter the sample identification number into the terminal and have output those tests that have or have not been completed. To this end, LIS acts as a status reporter.

Within the LIS there is an indirect link beteen the LIS internal code and the SIS code, which is the location identifier for water quality sampling stations on rivers, streams and lakes. On the sample submission forms received by the Laboratory, a description of the sample location is included as well as the location identifier which consists of the location identification code and the mailing address of the organization taking the sample. A short location description, the internal LIS sample code, and the sample station identification number are entered into the system, so that at any time during the testing process the technician can enter the internal LIS code and obtain on the terminal screen the short location description.

Once all of the tests are carried out, a summary report of test results is produced, which is then sent back to the organization where the sample originated (such as the Ministry of Natural Resources, the Ministry of the Environment or the Ministry of Health). One report is maintained in the files of the Laboratory. A magnetic tape with the test results is also sent to the computing facilities of the Ministry in Downsview.

The water quality analysis results carried out by the Laboratory are then incorporated into the water quality Sampling Information System (SIS), the data base of which is located at the Computer Centre at Downsview. A sample of the interim report as well as an example of the SIS output are contained in the Appendix.

OBSERVATIONS

There are different location identification codes used within the Ministry of the Environment. For example, water plants as well as sewage plants have their own identification codes which are different from the water quality sampling station identification codes. This has necessitated the development of an internal coding system which is linked to the location identification code and uniquely identifies each sample received. Common codes could facilitate links of data bases for sample analyses.

FUTURE NEEDS AND WANTS

This Section would like the ability to enter the stations location identification into the LIS when samples initially arrive at the Laboratory and to produce automatically those tests which must be carried out on these samples. At present, when the samples are received, the technician is required to input those tests which must be carried out. This process will be automated in the near future.

G.I.S. POTENTIAL

There are limited benefits that can be realized from G.I.S. by this Laboratory Section. It should be noted that this Laboratory is concerned with carrying out tests on the samples, the results of which are sent back to the organizations from which the samples were received.

DATA SOURCE INFORMATION SHEET

TITLE: Lab Information System

SOURCE AGENCY: Ministry of the Environment

PERSON: Serge Villard
TITLE: Manager, Lab Services Branch
ADDRESS: P.O. Box 213
Rexdale, Ontario
M9V 5L1

PHONE: (416) 248-3036

DESCRIPTION: automated work scheduling and recording of water sample analyses.

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 150,000 samples

GROWTH RATE: 150,000 samples per year

DATA ITEMS: program #, sampling dates, agency, location of sample (by feature name eg river name), field sample #, sample description, lab sample number, results of analyses eg. amount of lead contained in sample, location identifier, common with sample information system #

RETRIEVAL KEY(S): sample location number assigned by sample Information System.

GEOCODE:

DATE OF CREATION: 1981

FREQUENCY OF UPDATE: several times a week
150,000 samples a year,
1.5M analyses

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: lab analysis reports

USERS OF INFORMATION: field crews, sample information. System for merging and publication of data.

VOLUME/FREQUENCY OF USE: continual as per publication.

ACCESS METHOD FOR USER: Via publication and inquiry for report generation.

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: HP 3000, MOE Rexdale, Ontario

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
Information on the computer system is only kept on-line until work on sample is completed It is then transferred to the Downsview system for merging with the Sampling Information System.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Laboratory
Information
System (LIS)

Laboratory Services Branch

Ministry of the Environment

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

			TABULAR DATA								CARTOGRAPHIC DATA																																												IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
											GENERATION						STORAGE	MANIPULATION / ANALYSIS																												DISPLAY																						
																		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Maintaining LIS	○	●	●	●	●	●	●	●																																																										

6.2.3 WATER RESOURCES BRANCH

6.2.3.1 ADMINISTRATION AND DATA SERVICES SECTION
WATER SAMPLE INFORMATION SYSTEM (SIS)
WATER WELL INFORMATION SYSTEM

ORGANIZATION AND RESPONSIBILITIES

The primary mandate of this Unit is to administer and maintain two water resources information data bases. These data bases are: the Water Sample Information System (SIS), and the Water Well Information System.

The SIS is utilized by a number of ministries such as Health and Natural Resources to store water sample data. This Section has the specific responsibility of screening water sample data from rivers and the Great Lakes entered into the SIS by the Ministry of the Environment. The other ministries are responsible for their own data in the SIS.

This Section is responsible for ensuring that the information entered to both data bases is accurate. In regard to the water quality samples, this Section also checks the incoming data to ensure that the locations from which the samples are reportedly taken are valid. Should it appear that the stations are not, the Section notifies necessary field crews of the discrepancies.

The Administration and Data Services Section is responsible for not only the input of the data, but also its maintenance within the system, and retrieval of data requested by outside organizations or individuals. Data is also provided for publications prepared by the technical sections, such as the Hydrological Unit and the Great Lakes Section.

A staff of four persons within this Unit fulfill this mandate.

TASKS/SYSTEMS

1. Maintain Water Quality SIS Files

The water sample data that is entered into the SIS originates from:

1. Approximately 600 specific locations that are monitored annually on the inland waterways of Ontario. These inland waterways include both rivers and lakes. Approximately 12,000 to 14,000 water samples are collected annually.

2. 600 water sample locations that are selected on and around the Great Lakes each year. Approximately 12,000 to 14,000 water samples are collected, primarily near the shores and in the abutting channels of the Great Lakes. Each year the locations of these stations change as appropriate, following analysis and comparison of results with previously obtained data.

These stations are located by latitude and longitude, UTM co-ordinate, name of the sample point, for example, Lake Superior and Jack Fish Bay in addition to a 19-character station identification number assigned by this Section. The sampling process includes taking various observations, such as water temperature, the PH level of the water, the velocity of the water, and its temperature and transparency at different water levels. In addition, the date and time of sample collections are also recorded. Sample collections are carried out by Ministry of the Environment personnel, Ministry of Natural Resources personnel and/or by companies contracted for this purpose.

Once the samples have been collected at the station, they are then sent to the Ministry of the Environment Laboratory for analysis. Since 1980, the processing of results from analysis of the water samples at the Laboratory has been automated to a large extent. Once the sample is brought to the Laboratory, analytical requirements are entered on to a terminal from submission forms which accompany the samples. This process sets up the necessary tests that must be carried out for the analyses. All this information is entered into the Laboratory Information Data System which resides on an HP 3000 located at the Laboratory. This automated scheduling of the analysis allows one to determine the status of any particular sample submission at any time.

The results from the analysis are placed on magnetic tape along with other field data that is entered as a part of the submission process. All field data from Great Lakes and inland water sample points pass through the LIS whether or not they are tested. The magnetic tape from the LIS is then sent to the Computer Centre at Downsview where the results from the water quality sample analysis are input to the water Sample Information System (SIS). The sample results from the Great Lakes are uniquely identified from those of the inland waterways in the SIS. A sample computer listing showing this information is contained in the **Appendix**.

Once in the SIS data base, the water quality information along with the field observations are available for statistical analysis, modelling, and report generation. While most of the modelling and statistical evaluations are done utilizing facilities at the Downsview installation, some analysis is carried out in-house. Data within the SIS can be accessed by in-house terminals, and, using various statistical packages, charts and graphs can be produced. A 42"x36" flatbed plotter is used to produce these plots on paper. An example of a typical chart produced by this plotter is contained in the **Appendix**.

Reports based on the data in the SIS data base are produced annually. There is usually a lag period of 2 to 3 years in the publication of certain reports due to the substantial amount of checking of data carried out to ensure valid conclusions.

The information within the SIS data base can be accessed at any of the six regional offices. Each of the offices has a terminal which can be used to access the data base for water quality information. The reports that are produced are sent to the regional offices as well as municipalities, libraries, Conservation Authorities and universities among others. The **Appendix** provides an example of these reports.

OBSERVATIONS

At present, it does not appear that there is a major use of maps by this particular Section for the display of water quality analysis results. Some colour coded maps have been produced for presentation purposes, to delineate areas where fish may be contiminated.

There is another program in operation with which this Section is not directly involved, called the Hydrologic Information System. This program is a joint undertaking between the Ministry of the Environment and the federal government, involving the maintenance of hydrometric stations where the flow of the water and its volume are measured. This information is recorded on paper tape which is then digitized, and the resulting data entered into the computer. This water flow information is correlated with the water quality data in the SIS. In other words, users of the SIS can access and retrieve the water flow/volume measurements for a particular hydrologic station by the use of a station code. This flow and volume data is essential for many water quality analysis programs.

The information within the SIS data base can be retrieved by the use of a variety of retrieval keys.

FUTURE NEEDS AND WANTS

No land-related needs and wants were identified.

G.I.S. POTENTIAL

The SIS contains approximately 500,000 sequential water sample/water quality analysis records. This data is used by a variety of other branches within the Ministry of the Environment. The majority of the data evaluation is carried out through the use of modelling programs and statistical analysis packages. These modelling programs are currently being used by a number of branches within the Ministry.

Due to the large amounts of geographically-related data within the data base, it would seem that the ability to have this information plotted on a map would help in the evaluation of the data. Furthermore, by utilizing a standard map base, the water sample/water quality analysis information could be plotted, and utilized by other ministries such as the Fisheries Branch of the Ministry of Natural Resources, which would have a direct interest in the knowledge of water quality in particular areas. This would imply the requirement for a standard geographic location identifier, most probably a UTM geocode. The data within the SIS is currently identified by latitude and longitude and UTM co-ordinates. Additionally, the capability to carry out flow simulations would be useful for this and other Sections.

1. Maintain Water Well Information

Every drilling contractor in the Province of Ontario must fill out a log report for every water well drilled in the province. This data is sent to the Water Resources Branch which issues annual licences to these contractors. The Administration and Data Systems Section stores this data on microfiche and in the automated Water Well Information System.

There are approximately 250,000 records within the Water Well Information System. Some of these records date back to 1946. Until 1980, approximately 10,000 to 12,000 water wells were drilled each year. However, the last three years have experienced a decline in drilling; now approximatley 7,500 wells are drilled per year. This data is updated monthly by the batch processing of 600 to 700 new records.

The water well record form filled out by the drilling contractor contains a variety of information, including a log of the soil stratification, or the type of soil at different depths, and the size of the well. In addition, a sketch of the location of the well must be produced on the form. This sketch shows in schematic format the distance of the well from the road and lot line. The water well record form not only identifies the well and soil characteristics, but also provides well location information in the form of address, including identification of the county or district, township, concession and lot number. A sequential code is also assigned to each well drilled. The first two digits of this seven-digit code consist of a county identifier. The susbsequent five digits represent a sequential number assigned to each well within that particular county.

Once the record is received by this Section, it is assigned a unique number and the record is then sent to the appropriate regional office, whose personnel will inspect and verify the drilling records. The form is then returned to this Section for keypunching and entry into the computer. After this process, the record is microfilmed and the hard copy record sent back to the regional office for retention. This Section maintains the microfilm record. The locations of drilling sites are also recorded on NTS maps at scales of 1:25 000 and 1:50 000 for northern areas. UTM co-ordinates of the well sites are also obtained, and these are also input into the data base.

One of the problems previously experienced by this Section as well as individuals and organizations using water well information is that the well location co-ordinates have been inaccurately recorded in many cases. As a result, users of these maps have had to access the actual water well records on file or in the data base, and plot the information by the use of the address (the concession and lot number). The plotted locations and recorded UTM co-ordinates obtained during the last eight years, however, have been correct. A sample of the computer output as well as the water well record forms are contained in the Appendix.

The data maintained by this Section is used for a variety of purposes. These include the use of the log information, such as the soil stratification records for the production of soil maps and ground water pattern maps by the Hydrology Section. Drilling contractors also access the data files on a regular basis to predict the capabilities of wells to be drilled in certain locations. This enables the contractors to quote reasonably accurate drilling costs to their potential clients. This gives them an advantage over other contractors who may not be familiar with the particular drilling location, and would have to make a reasonable guess as to the expected cost of drilling a well in a particular location.

OBSERVATION

Well record data can be obtained from the water well data base by one of two methods. The first involves identifying the particular well for which information is desired by the site address, which includes the concession and lot number. The second method of access requires defining the particular area for which information is desired. A number of well records can be obtained for a particular area by defining that area by UTM grid. Once the location has been identified, all those wells falling within that area will be listed.

In the past, identification of UTM co-ordinates for the individual water wells was inaccurate for many reasons. Accordingly, the location of water wells plotted on NTS maps did not instill much user confidence. Persons wishing to utilize this plotted information are usually advised to cross-check the locations of the wells as plotted with the address information provided on the well records themselves or on the computer output listings. New well records being input to the system now have accurate UTM co-ordinates and are plotted accurately.

FUTURE NEEDS AND WANTS

No future needs and wants were identified by this Section.

G.I.S. POTENTIAL

Maps are currently being used to plot water well location data. This information, if plotted on the same maps as the data obtained from the water Sample Information System (SIS), will not only be of use to other branches within the Ministry of the Environment for environmental assessment, but also for use by other ministries. By the same token, use of standard maps to show information from other ministries may be of use to the departments analysing the water well data and water sample/water quality from the SIS. This process could probably be facilitated by the use of a common digital base map, in particular, the OBM maps.

DATA SOURCE INFORMATION SHEET

TITLE: Water Quality Sample Information System

SOURCE AGENCY: Ministry of the Environment
PERSON: Kenneth S. Rego
TITLE: Supervisor Administration & Data Services
ADDRESS: 1 St. Clair Ave West
Toronto, Ontario

PHONE: (416) 965-6141

DESCRIPTION: a listing of water quality parameters associated with specific water samples from water sample stations

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	x		
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: approximately 500,000 records (250,000 for Great Lakes) (250,000 for inland waters)

GROWTH RATE: 24,000 - 28,000 records annually

DATA ITEMS: lake name, sample location, station type, major basin name, minor basin name, date, station identification number assigned by MOE, region (MOE) code number, latitude and longitude, water parameters such as depth, distance from shore, type of chemicals, etc., UTM

RETRIEVAL KEY(S): latitude/longitude, region, name of sample point, 19 character station identification number

GEOCODE: latitude/longitude, region

DATE OF CREATION: 1965

FREQUENCY OF UPDATE: 2,000 records a month

COVERAGE/COMPLETENESS: Ontario waterways

SOURCE OF INFORMATION: water samples submitted by MOE field crews and results for MOE Laboratory

USERS OF INFORMATION: internal to MOE, MNR, municipalities, consultants, universities, Ontario Hydro, public, Conservation Authorities

VOLUME/FREQUENCY OF USE: daily as per distributed reports

ACCESS METHOD FOR USER: telephone on terminal query, via generated reports

AVAILABILITY: general

CHARGES: reproduction cost ($30.00)

HARDWARE AND LOCATION: IBM mainframe, Downsview

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: Wells Data System

SOURCE AGENCY: Ministry of the Environment

PERSON: Kenneth Rego

TITLE: Supervisor Administration & Data Services

ADDRESS: 1 St. Clair Avenue West
Toronto, Ontario

PHONE: (416) 965-6141

DESCRIPTION: inventory of all water wells in Ontario

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	X		
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 250,000 wells

GROWTH RATE: 10,000 - 12,000 wells per year (7,500 in last year)

DATA ITEMS: region, township, concession, lot, UTM, elevation, date, driller, casing diameter, head of water, depth of water found, pump level, test rate, water use, soil type, well number (sequentially assigned and with county code numbers)

RETRIEVAL KEY(S): address (concession, lot), well number, UTM grid

GEOCODE: well number, region, township, lot, concession

DATE OF CREATION: records dating to 1946

FREQUENCY OF UPDATE: 1,000 records monthly

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: drilling contractors from completed forms

USERS OF INFORMATION: drilling contractors, MOE, public

VOLUME/FREQUENCY OF USE: several times a week

ACCESS METHOD FOR USER: terminal at 1 St. Clair Ave W.

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: IBM mainframe, Downsview
*

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

*for in-house data analysis this Unit utilizes the following:
- HP 9845 with printer; plotter;
- PDP 11/34 with printer (used to carry out analysis such as ground water dispersion modelling);
- Textronics system with flatbed plotter

DATA SOURCE INFORMATION SHEET

TITLE: Maps of Well Locations

SOURCE AGENCY: Ministry of the Environment
PERSON: Kenneth Rego
TITLE: Supervisor Administration & Data Serv.
ADDRESS: 1 St. Clair Ave W.
Toronto, Ontario

PHONE: (416) 965-6141
DESCRIPTION: on NTS map with well locations e.g. identifiers superimposed

FORMAT:

	M	A	MEDIA
MAP	X		
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE: NTS base with theme on top

SCALE: 1:25,000 for Southern Ontario
1:50,000 for Northern Ontari

ACCURACY/RESOLUTION: as per NTS series

SIZE/VOLUME: several hundreds

GROWTH RATE: 0

DATA ITEMS: water well locations, water well identification number (county code plus sequentially assigned identification number), NTS base data

RETRIEVAL KEY(S): NTS map sheet number

GEOCODE: water well identification number

DATE OF CREATION: records back to 1947

FREQUENCY OF UPDATE: 1,000 records monthly

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: complered forms from drilling contractors

USERS OF INFORMATION: drilling contractors for use in cost estimates of wells in certain areas, MOE

VOLUME/FREQUENCY OF USE: several times a week

ACCESS METHOD FOR USER: manual retrieval of map/records

AVAILABILITY: open

CHARGES: depends on volume
15¢/photocopy
$120/county printout

HARDWARE AND LOCATION: microfiche files, 1 St. Clair Ave. W. and regional offices (hardcopy)

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

Ministry of the Environment

Administration and Data Section

LEGEND:
- ○ MANUAL PROCESS
- ● NOW DONE MANUALLY WANT TO AUTOMATE
- ◉ AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA: GENERATION						STORAGE
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Maintain water quality files	○		●	●		◉	◉	◉							
2 Maintain well data files	○	●	●	◉											

AGENCY FUNCTIONS	CARTOGRAPHIC DATA: MANIPULATION / ANALYSIS: GEOMETRIC ANALYSIS													
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Maintain water quality files				◉			◉							
2 Maintain well data files				◉			◉							

AGENCY FUNCTIONS	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Maintain water quality files		☐											◉	◉
2 Maintain well data files														

AGENCY FUNCTIONS	DISPLAY: COMPOSITION					DISPLAY: PRESENTATION				
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Maintain water quality files							☐	☐		☐
2 Maintain well data files					☐		◉			◉

AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Maintain water quality files								◉	◉				
2 Maintain well data files													

6.2.3.2 HYDROLOGY AND MONITORING SECTION
NETWORKS UNIT
WATER TAKING INFORMATION SYSTEM
STORET SYSTEM
HYDROLOGY INFORMATION SYSTEM

ORGANIZATION AND RESPONSIBILITIES

The Networks Unit is one of six units within the Hydrology and Monitoring Section. It consists of the following sub-units: Surface Water Quality, Surface Water Quantity, and Ground Water Quantity and Quality.

The responsibilities of this Unit are to co-ordinate the requirements and activities of the Ministry's regional offices in regard to water quality and stream flow data. It also provides liaison for the regional offices with the federal government in regard to the cost-sharing program for water quantity data. The Networks Unit has a staff of approximately eight personnel who carry out its responsibilities.

TASKS/SYSTEMS

1. Issue Water Taking Permits

Under Section 20 of the Water Resources Act, the taking of over 50,000 litres of water per day from a source of water must be authorized by the Ministry of the Environment. This authorization takes the form of a water permit that must be submitted by organizations within both the public and private domains. The permit applications are processed through the Ministry's regional offices and are issued and stored at the regional offices. Of the six regions, five have some of this permit application data on computers; however, there is no link between the various computer files that are maintained at each region. A copy of the existing water taking permit application is contained in the Appendix.

The head office has the responsibility of co-ordinating activities among the six regions, developing policy and dealing with legal matters referred to it from the regional level. In regard to legal matters, the water taking permit acts as a quasi-legal device which permits the Ministry to stop or limit the amount of water taken from a particular source by a person or organization. One instance when this may be used would be when the water taking activities of a particular farmer affect the water usage activities of nearby permit holders.

There are approximately 6,000 active permits on file. Approximately 600 new applications are received per year, however, since some permits do expire and are not renewed, the growth rate approaches zero.

When an application is received and processed by the regional office, several tasks are performed. Notwithstanding the actual issuance of the permit, a manual permit file is created in which a portion of an NTS 1:25 000 or 1:50 000 map is used to depict the location of the permit holder along with the permit number and is placed in the file. A sample of this type of map is provided in **Figure 6.2.3.2-A.** The permit file is referenced by the address of the permit holder, whether it be a municipality, industry or private individual such as a farmer, the municipal location code and the STORET code. In addition to this, the UTM co-ordinates of the water source are also identified from the NTS maps. Samples of the application and coding forms are contained in the Appendix. In those regions that have automated permit files, permit listings can be obtained by permit holder, county, municipality, watershed or water use.

In the past, this Section had its cartography staff remap the NTS series of maps according to water basins rather than by grid. This was to facilitate the work carried out by this Section. However, this activity has ceased due to the lack of available resources.

2. Identify and Maintain Water Source Information Using STORET

STORET is a numeric coding system that was developed in order to provide a code to all water sources in Ontario. These water sources include lakes, rivers and streams. STORET had its genesis in the United States where it was developed as a comprehensive management system for water resources. The STORET system used by the Ministry of the Environment in the Province of Ontario utilizes only the hydrologic codes from the overall system developed in the United States.

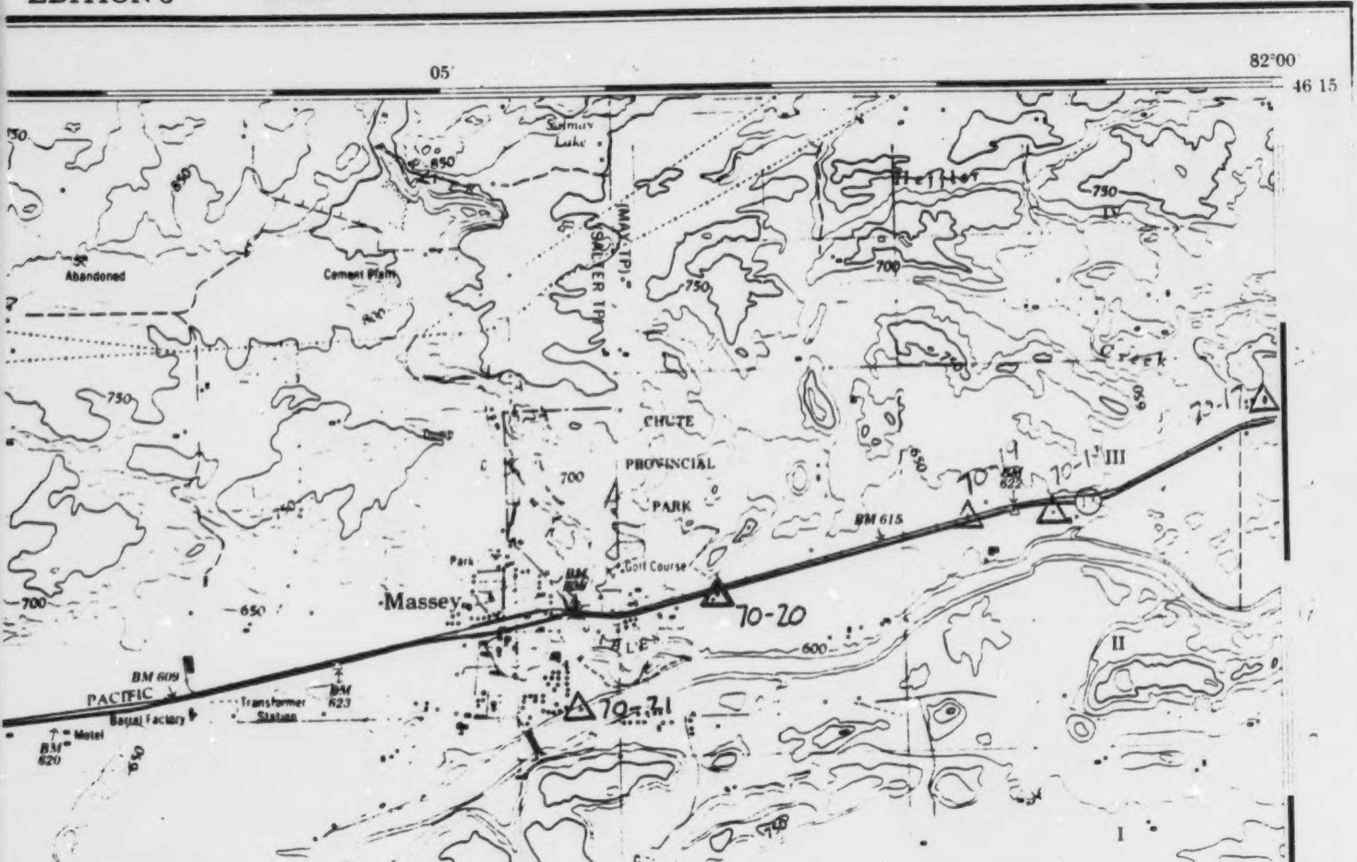
While the Ministry of the Environment is not utilizing the concept of the total management system, it is using the same approach to systematically identify each body of water through the use of this numeric code. The Great Lakes or "Major Basin" water bodies, as well as all other lakes otherwise known as "Minor Basins", are provided with unique STORET identification codes. The rivers and streams in the province are given codes which start at confluence and work back to their sources via the various tributaries. Each junction of a river with either a lake or its tributaries is provided with a code (i.e., each new junction is provided with a consecutive number), hence a river's STORET code may consist of several "levels" of codes. Associated with each STORET code are the names of the rivers and streams along with the UTM co-ordinates of the coded location.

The STORET file also maintains the distance between any two consecutive coded points. STORET codes have been assigned to all water bodies in the Province of Ontario, as well as to over 1,000 municipal water sewage treatment plants in the province. In total, several hundreds of thousands of codes are estimated to be maintained in a manual filing system.

Although the Ministry of the Environment began using the STORET code in 1972, it has not been automated.

At present six systems within the Water Resources Branch of the

EDITION 3 WATER TAKING SITES Figure 6.2.3.2-A 41 J/1


05'
82°00'
46 15
10'
Salmay Lake
650
750
700
Abandoned
Cement Plant
(MAY TP)
(SALTER TP)
CHUTE
PROVINCIAL
PARK
Creek
IV
III
70-17
70-19
70-18
BM 615
BM 622
Dump
Park
Golf Course
Massey
70-20
70-21
600
II
BM 609
PACIFIC
Transformer Station
BM 623
Motel
BM 620
I
Silo
(MAY TP)
(HARROW TP)
900
VI
Manido Lake
700±
SUDBURY DIST
ALGOMA DIST
SALTER, MAY AND HARROW TP
Sawmill
La Cloche
Little
La Cloche
Lake
675±
Sagamok
V
IV

Ministry of the Environment make use of the STORET code. These systems are as follows:

- **Water Supply and Pollution Control Section** - Utility Monitoring and Information System (UMIS), and the Total Utility Monitoring and Management Information System (TUMMIS).
- **Hydrology and Monitoring Section** - Water Taking Information Records and the Hydrology Information System (HIS).
- **Quality Control Section** - The Industrial Monitoring Information System (IMIS).
- **Administrative and Data Services Section** - The Water Sample Information System (SIS).

Although a large inventory of STORET codes exists in a manual file format, it has not been automated since the STORET approach is not used for location identification by organizations outside of the Water Resources Branch. It appears that this is due to the following reasons:

a. Government organizations outside the Water Resources Branch and the Ministry of the Environment have their own preferred methods of water course location identification.

b. If more systems were to make use of the STORET approach, the STORET code library would have to be automated. The costs associated with this ranges from approximately $60,000 to $100,000. This cost would have to be absorbed by the user organizations.

3. Maintain the Hydrologic Information System (HIS)

The HIS is an automated record file system which contains approximately 160,000 measurement records. In this system, one month of daily measurement data is equivalent to one record. Development of the HIS began in the early 1970s, and was intended as a historic data file system to store several categories of information that may be used by the Ministry of the Environment. The type of information that was to be maintained by this system were rainfall/precipitation measurements, ground water levels, soil moisture and stream flow measurement data. However, since 1975 the only category of information that is still being actively maintained within the system is the stream flow data obtained from the Network's measuring stations.

Water flow data and, hence, water quantity data is obtained via hydrologic flow gauges located on many rivers and streams in Ontario. A total of 450 gauges are operated by the Water Survey of Canada, of these 54 gauges are paid for by MOE under a cost-share agreement and the rest are paid for by MNR, Ontario Hydro and the federal government. The federal government has similar programs with the other provinces. The federal government has become involved in this water program since it is a major user of the data.

Environment Canada not only analyses this data but also publishes annual reports for each of the provinces in Canada. A copy of a portion of this report is contained in the Appendix.

The data from the stations is collected by water survey staff who bring the analog record tapes to their Guelph offices where they are digitized. MOE contributes data for eight stations to the water survey for inclusion in their data publication as "contributed data". This information is then forwarded to Environment Canada where it is analysed and the data placed on magnetic tape. The magnetic tape which contains the surface water flow data is then forwarded to the Ministry of the Environment's Computer Centre located at Downsview. This data is then input to the Hydrological Information System (HIS). The stream flow measurements for a particular station are referenced by the station name, a federal alphanumeric code which is cross-referenced with a MOE numeric station code. UTM co-ordinates and latitude and longitude are also assigned for many of the stations. These co-ordinates have been obtained from NTS topographic maps.

Access to the HIS data is through batch processing which can either be carried out through the head office in Toronto or through the regional offices. The historic data, some of which goes back to 1900, is available on microfiche. Data on the computer files can be listed in a variety of formats which include the identification of stream flow stations by federal and provincial codes, by individual measuring stations with summary measurements presented as well as summary statistics. Besides the use of several standard statistical analysis programs that the individual accessing the data can use, a modelling program is available, as well as the ability to have charts and graphs produced by a plotter. A typical time versus discharge hydrographic chart produced by a plotter is contained in the Appendix.

There is a link between the HIS and the water sample information system (SIS). Users of the SIS have what is called a conversion option which allows one to read the HIS file and draw off from it quantity of water flow for a particular station at a particular time. Water quantity flow is one of the parameters that is not measured by the water quality sampling stations. For this reason and the fact that water quantity is an essential parameter in many water quality investigations, this link has been developed.

The data in HIS is accessed and analysed by the Hydrology and Monitoring Section for waste loading rates and for water quality analysis in rivers and streams. The Ministry Regional Offices access the data to carry out studies such as waste assimilation assessments, in which the capacity of a river or stream for assimilating waste discharge is determined. The regional offices use these results to enforce guidelines with respect to the amount of waste discharged in rivers and streams.

Organizations outside the Ministry of the Environment obtain any stream flow data from the Water Surveys of Canada through publications or special requests. Organizations such as the Streamflow Forecast Centre of the Ministry of Natural Resources, Conservation Authority Branch, use the streamflow data for predicting floods. The Ministry of Transportation and Communications uses the data for such projects as determining the proper size of road crossings over streams. Consulting engineers also use the data in the design of water treatment plants and projects for the Ministry of

Transportation and Communications.

OBSERVATIONS

At present, there appear to be no problems associated with the water taking permit information records system. The program has been in operation for some time now and it appears that most of the major problems associated with the administration of this program have been resolved.

The major problem associated with the STORET approach to coding rivers and streams in Ontario, is that it is not being widely used, and has fallen into disuse. Until some major benefits can be identified for its use, it will probably remain in its manual file format and not be used to any great extent in the future.

The HIS is utilized mainly for longer term studies. One of the reasons for this is the length of time for the data to be collected from the stations and digitized, sent to Environment Canada where it is analysed, and sent in turn to the Downsview Computing Complex of the Ministry of the Environment where it is finally input to the HIS. Several weeks or months may elapse from the time that the measurements are taken at the water flow stations to the time at which it is input to the HIS. Although preliminary computer listings can be produced at various stages throughout this process, the results cannot be guaranteed.

FUTURE NEEDS AND WANTS

At present, applications for water taking permits are plotted on NTS maps at the regional offices in order to provide a visual inventory of the existing permits and to provide a feeling as to the water usage in particular areas. It has been expressed that the ability to place this on a digital base map, which in turn would be linked to the actual automated permit files, would enhance the monitoring and analysis capabilities of the regional offices.

In regard to the STORET coding system, it is hoped that this would one day be automated and used as a standard reference by all the regions for the permit applications. At present, each region maintains separately their own permit applications on computers or word processing systems.

In regard to the HIS, it is hoped that more data will be input eventually to the system, and that the different types of data will be correlated. One example would be to obtain rainfall runoff and correlate this to water quantity measurements taken in rivers for the same area. It is felt that Conservation Authorities concerned with area flooding would be interested in this capability. One of the reasons for not developing this capability at present is the lack of resources available.

G.I.S. POTENTIAL

The monitoring and analysis of water taking information may be enhanced with the availability of a digital map base linked to automated water taking information records. At present, 1:50 000 scale NTS maps are utilized for plotting purposes. It appears that a small scale digital topographic map would be sufficient for the needs of this Section.

At present, the STORET Code Library is stored in a manual format. Due to the relatively small number of users, this manual approach is probably sufficient, however, should the number of STORET code users increase in the future, the availability of an automated STORET library may be a necessity.

The HIS, as a storage and retrieval system, appears very adequate. The availability of additional modelling capabilities, such as rainfall runoff to determine its effects on surface water quantity in rivers and streams, would be useful. These analyses may be further enhanced by the availability of digital terrain modelling capabilities for runoff analysis.

DATA SOURCE INFORMATION SHEET

TITLE: Water Taking Information (Permits)

SOURCE AGENCY: Ministry of the Environment

PERSON: D. J. Vallery

TITLE: Geologist, Networks

ADDRESS: 1 St. Clair Ave West
Toronto, Ontario
M4V 1K6

PHONE:

DESCRIPTION: set of files for Water Taking Permits (each set at regional offices; figures below indicate total for province)

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 6,000 permits

GROWTH RATE: 400 new permits per year
400 per year expire or are cancelled

DATA ITEMS: name of applicant, mailing address of applicant, telephone number, postal code, source of water, location of taking by lot, concession, township, region or district, city or town, location of water use, purpose of taking, amount, date, permit number

RETRIEVAL KEY(S): permit number, applicant name, watershed, municipality

GEOCODE: township, lot, concession, region or district, municipal code, UTM co-ordinates

DATE OF CREATION: 1977

FREQUENCY OF UPDATE: 10 permits per week

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Application coding forms submitted to Head Office

USERS OF INFORMATION: MOE regions

VOLUME/FREQUENCY OF USE: once daily

ACCESS METHOD FOR USER: terminal or manual file retrieved at regional offices

AVAILABILITY: general

CHARGES: none

HARDWARE AND LOCATION: M.G.S. mainframe
personal computers unique to each region

SOFTWARE: unknown

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: Storet Codes

SOURCE AGENCY: Hydrology & Monitoring
PERSON: Water Resources Branch
TITLE: D. Vallery, Geologist
ADDRESS: Network Environment Planning Div.
Min of Environment
1 St. Clair Ave. W. Toronto

PHONE: 416-965-6991

DESCRIPTION: A numeric coding system for identifying all water sources in Ontario such as lakes, rivers and streams.

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	xx		card file
IMAGE			
TEXT			
LIBRARY			

NOTE: N/A

SCALE: N/A

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME:
Estimated several hundred thousand

GROWTH RATE:
marginal

DATA ITEMS:
- code number
- name
- UTM coordinate of coded point
- distance to next coded point

RETRIEVAL KEY(S):
name
code number

GEOCODE:
UTM coordinate

DATE OF CREATION: 1972

FREQUENCY OF UPDATE: N/A

COVERAGE/COMPLETENESS:
entire province

SOURCE OF INFORMATION:
existing maps

USERS OF INFORMATION:
Water Resources Branch of
Ministry of Environment

VOLUME/FREQUENCY OF USE:
occasional

ACCESS METHOD FOR USER:
manual access, must contact networks unit of Hydrology & Monitoring Section

AVAILABILITY: open

CHARGES:
None

HARDWARE AND LOCATION:
Manual file at 1 St. Clair Ave. West

SOFTWARE:
N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: HYDROLOGY INFORMATION SYSTEM

SOURCE AGENCY: Surveys Water Networks Unit
PERSON: J.D. Eddie
TITLE: Technologist
ADDRESS: Water Resources Branch
Min of the Environment
1 St. Clair Ave. W
Toronto, Ont
PHONE: 416-965-9661

DESCRIPTION:
An automated record file system containing stream flow data

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	disc
IMAGE			
TEXT			
LIBRARY			

NOTE: N/A

SCALE: N/A

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME:
160,000 measurement records obtained from 450 gauges

GROWTH RATE:
approximately 6,000 records/year

DATA ITEMS:
- station code and name
- latitude and longitude
- drainage area
- stremflow (cubic meters per second)

RETRIEVAL KEY(S):
station numbers

GEOCODE: latitude and longitude

DATE OF CREATION: early 1970's

FREQUENCY OF UPDATE: daily

COVERAGE/COMPLETENESS:
entire province where gauges located

SOURCE OF INFORMATION:
stream flow gauges

USERS OF INFORMATION:
- Ministry of the Environment as well as other ministries at the provincial and federal level
- private companies and
- research institutes

VOLUME/FREQUENCY OF USE:
daily

ACCESS METHOD FOR USER:
- through HIS for Ministry of the Environment
- through Water Surveys of Canada for requests outside the M.O.E.

AVAILABILITY:
HIS available to M.O.E. inquiries

CHARGES:
none

HARDWARE AND LOCATION:
mainframe computer Downsview computer centre

SOFTWARE:
unknown

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
ability exists to produce business graphics plots of measurement

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

HYDROLOGY & MONITORING
SECTION
WATER RESOURCES BRANCH
ENVIRONMENTAL PLANNING DIV
MINISTRY OF THE ENVIRONMENT
1 ST CLAIR AVE WEST
TORONTO, ONT

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

		TABULAR DATA								CARTOGRAPHIC DATA																																													IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIO-GRAPHIC DATA			REFERENCE TO DATA TYPES
										GENERATION						STORAGE	MANIPULATION / ANALYSIS																												DISPLAY																							
																	GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
AGENCY FUNCTIONS		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Maintaining water taking information	○	●	●	●	●		●	●							○	●			●					●																		●	●							●			●													
2	Maintaining the hydrology information system	●	●	●	●	●	●	●	●																										☐				☐																							●	●				
3	Storing Storet and code information				●	●		☐																																																											

6.2.3.3 QUALITY PROTECTION SECTION
INDUSTRIAL ORGANICS UNIT
INDUSTRIAL MONITORING INFORMATION SYSTEM (IMIS)

ORGANIZATION AND RESPONSIBILITIES

The primary land-related responsibility of the Industrial Organics Unit is to develop policy and programs and to audit performance by monitoring industrial discharge into water, air and land. For this purpose, the Industrial Monitoring Information System (IMIS) was developed to maintain an inventory of industrial discharge. Currently, this system is only operational for effluent discharge. A joint committee, composed of regional and planning staff, see that this mandate is fulfilled.

TASKS/SYSTEMS

1. Maintain Industrial Monitoring Information System

The district offices within each region receive and verify discharge data from industries on a monthly basis. This data is provided by the industries to the regional offices on a voluntary basis. There are approximately 200 companies contributing data to this system. The district offices enter and update the data via terminals which are linked to the central Downsview Computer System. Currently, not all regions are automated in this fashion, however, it is anticipated that in the near future all regions will have digital capabilities. Some of the parameters and data items that are collected are:

a. Company number, which is made up of an industry code, a sequentially assigned number by the Ministry of the Environment, and a site code.

b. Company plant name, company address, and phone number including postal code, municipal code, MOE region/district code, provincial electoral district code, latitude/longitude, UTM co-ordinate, identification of the streams into which effluence is discharged, plant manufacturing classication, industrial classification, effluent identification and volumes and a variety of parameters including ALKOH, ALKT, CILDUR, etc.

OBSERVATIONS

Although this system is not yet operational, it is anticipated that all water data collected up to and including 1983 will be entered into the system by January of 1984. Continuing data input will result in the completion of the data base by 1985. The Unit anticipates future needs for data by formatting the records such that future air and landfill data can be included, as well as other parameters within each of the effluent discharge data.

It is anticipated that this system will be linked to other data bases and used by other sections within the Ministry of the Environment. For example, the Water Quality Section will use this data to correlate the water quality at discharge points to the abatement strategy.

The use of IMIS is expected to enhance the work of present pollution information users. These include:

- **Ministry of the Environment Regional Offices** to monitor industry compliance with existing emission standards, and enforcement of pollution standards.
- **Ministry of the Environment Branch Offices** to review and assess current pollution standards. Other branches are expected to use IMIS in addition to the Water Resources Branch once the other emission categories are incorporated. Branch offices will also be able to provide ready answers to queries received from Parliament and other sources.
- **Academic Sector and Public Interest Groups** for research and analysis of the effects of pollution on the environment and health.
- **Municipal Planning and Engineering Departments** which have occasional enquiries when considering the siting of particular industries. Enquiries usually address the type and amount of pollution emission associated with a particular industry. This information is used by the municipality to evaluate existing sewage facilities and determine whether any special zoning by-laws need to be made.

FUTURE NEEDS AND WANTS

It is anticipated that this system will be used for a variety of data manipulations and statistical analyses in the future. The Unit also anticipates that industrial air quality and landfill data will be included in this data base in order to provide a comprehensive industrial pollution data base from which to monitor and plan for Ontario's pollution control.

G.I.S. POTENTIAL

This system would provide an important linkage to a total data base for the Ministry of the Environment, since many people would benefit from access to this information and use it in conjunction with their own data bases. Due to the land-related nature of the data, the analysis capabilities of this Unit could be enhanced by the provision of a G.I.S. system offering the ability to plot various discharge sites along with other water and air quality data to display possible correlations of pollution sources with sites. Trend analysis, determination of confidence limits, planning and monitoring are desired activities in the future.

DATA SOURCE INFORMATION SHEET

TITLE: Industrial Monitoring Information System (IMIS)

SOURCE AGENCY: Water Resources, MOE

PERSON: W. P. Suboch

TITLE: Head, Industrial Organics Unit

ADDRESS: 1 St. Clair Avenue West
4th floor
Toronto, Ontario

PHONE: (416) 965-6954

DESCRIPTION: an automated inventory for industrial discharge into water, air and on land

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: N/A

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: at present 200 companies are on the inventory. These are the major effluent sources

GROWTH RATE: 200 major air pollution sources and 100 major landfill sites

DATA ITEMS: sequential company code, plant name, address, municipal code, latitude/longitude, UTM co-ordinates, identification of rivers and lakes, discharge category

RETRIEVAL KEY(S): company code

GEOCODE: UTM co-ordinates, latitude/longitude

DATE OF CREATION: 1968 (manual file)

FREQUENCY OF UPDATE: every month

COVERAGE/COMPLETENESS: entire Province

SOURCE OF INFORMATION: industrial sources

USERS OF INFORMATION: Ministry of the Environment and the public which includes industry, academia, Environment Canada

VOLUME/FREQUENCY OF USE: continuous

ACCESS METHOD FOR USER: via computer output

AVAILABILITY: open

CHARGES: none at present

HARDWARE AND LOCATION: mainframe computer at Downsview

SOFTWARE: unknown

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Industrial Monitoring Information System (IMIS)

Water Resources Branch

Quality Control Section

Industrial Organics Unit

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Maintaining IMIS	○	●	●	●	●	●	●	●

AGENCY FUNCTIONS		CARTOGRAPHIC DATA						
		GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Maintaining IMIS	☐	☐				☐	☐

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Maintaining IMIS				☐					☐		☐			

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Maintaining IMIS													☐	☐

AGENCY FUNCTIONS		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Maintaining IMIS										

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Maintaining IMIS													

6.2.3.4 WATER SUPPLY AND POLLUTION CONTROL SECTION MUNICIPAL SEWAGE UNIT

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Municipal Sewage Unit is to collect sewage and water treatment data for treatment facilities operated by the province. The Unit is also responsible for collecting and maintaining facility criteria data with which to compare sewage and water treatment data in order to determine any failures of compliance with sewage facility policies. In the future, this Unit will also collect sewage and water treatment data for municipally operated facilities. In addition, the Unit provides advice to facility operators and helps develop policies and guidelines relating to plant performance.

In order to fulfill this mandate the Unit maintains two types of records: description data which is a detailed description of all sewage and water facilities within the province, and operational data which outlines all of the operating parameters necessary to monitor sewage and water treatment operations.

A staff of approximately six persons complete the tasks in order to fulfill these mandates.

TASKS/SYSTEMS

1. Maintain Water and Sewage Treatment Data

a. Maintain Utility Management Information System

Operators of sewage and water treatment facilities are required to complete Utility Management Information System (UMIS) forms. These forms are filled out on a monthly basis from daily data maintained by each operator. The regional offices ensure that the data is correct and also monitor the plants to ensure that the treatment plants operate within given guidelines. The data is then sent to the Municipal Sewage Unit, where it is keypunched and batch processed into the IBM mainframe computer located in Downsview. The data is validated by the Municipal Sewage Unit. Once validated, it is used to produce a variety of reports to distribute to the regions and the public.

Users of the UMIS data include such organizations as the Regional Offices of the Ministry of the Environment for monitoring and enforcing standards; the Project and Evaluation Branch for monitoring on a province-wide basis chemical levels, flows and costs; engineering consultants who are interested in the operation of particular plants; and municipalities for general reference. It is expected that once data for municipal operated systems are incorporated into UMIS, the municipalities will utilize the system more often.

The federal government uses this data in publishing, country-wide, the

"National Inventory of Municipal Water Works and Waste Water Systems". Some of the parameters for which data is published include municipality name, municipal code, water flow, design flow, and type of treatment.

b. Maintain Descriptor File

For each water and sewage plant there is a utility descriptor record in the Utility Descriptor File. There are approximately 800 records in the Descriptor File. These records maintain information on: the works number which is assigned to each treatment facility by this Branch, the works name, the type of works, the capacity of the facility, the municipality name in which the facility is located, the population of the municipality, the type of facility, county, electoral district, ministry region and district, ownership, operating authority, system, class, and population served. There is also locational information for the facility with respect to latitude/longitude and UTM co-ordinates. For a detailed listing of the data items in the Descriptor File, see the Appendix.

c. Maintain Operational Data

Information in four categories is stored and linked to the Descriptor File. These include mechanical sewage data, lagoon facility data, surface water data, and ground water data. All of these use the works number as a link to the Descriptor File. These files contain a number of parameters pertinent to sewage and water treatment facility data. For example, the Surface Water File includes parameters dealing with water hardness, alkalinity, iron, chloride, conductivity, etc. The Ground Water File contains information on average flow, maximum flow, faecal content, nitrate conductivity, chloride, etc. The mechanical sewage data includes such information as level of BOD, level of ammonia, level of nitrate, level of nitrite, etc. The lagoon facility data includes such information as level of ammonia, nitrate, titrate, etc. For more detailed listings on these data, see the Appendix.

In the future, there will also be municipal data with respect to lagoon facilities and sewage facilities. See the Appendix for full listing of parameters.

This information is stored on the IBM mainframe at Downsview, Ontario. The Descriptor File information uses a package called GIS (General Information System). This package allows retrieval of data using any of the parameters as a key. The operational data is maintained using programs developed by the Systems Development Section of the Ministry of the Environment. The retrieval key in this case would be the region and municipality name.

d. Maintain Total Utility Monitoring and Management Information System

The Total Utility Monitoring and Management Information System (TUMMIS) is a new system implemented by this Unit. Within this information system is information regarding facility criteria and remedial measures with respect to water and sewage treatment plants. Currently, only the criteria for sewage treatment plants is available. These criteria will be compared to the operational data in order to determine if any treatment facility is not meeting the prescribed criteria for that facility.

The users of this information include the various Ministry of the Environment regions, consultants, laboratory staff, and internal use within the Water Resources Branch for monitoring and policing sewage and water treatment facilities.

OBSERVATIONS

Currently, links between other information systems within the Water Resources Branch are tenuous. However, there is a movement towards linking these information systems via certain retrieval keys. For example, this Unit is now looking into the possibility of using the STORET code in its Descriptor File. The STORET code is the code that was developed by MOE to uniquely identify various water systems within Ontario. The Municipal Sewage Unit is also moving towards integrating its data with the Sampling Information System (SIS).

Currently, some of the data that is stored in this Unit's UMIS system is also stored on the SIS system. With a linkage between the two systems this redundancy of data could be avoided.

FUTURE NEEDS AND WANTS

The Unit is moving towards collecting and maintaining all of the municipal sewage and water treatment information as well as the provincially operated treatment plants. Currently, the sewage information is being collected for municipal operated systems, however, water data is still not available in the UMIS system.

There is a desire to improve the accuracy of the location co-ordinates for the Utility Descriptor File. With respect to this, the Unit is looking into establishing a more accurate data base by visiting the regions and ensuring that their UTM co-ordinates, latitude/longitude, concession, lot, etc. data is all accurate and up-to-date.

It was stated that a business graphics package could be of benefit in producing some of the reports for the regional offices.

G.I.S. POTENTIAL

The Unit could benefit from a G.I.S. system in that the locational data maintained in the Utility Descriptor File could be more accurately established through linkage to an accurate base map.

Certain G.I.S. techniques would be useful, including point in polygon searches, windowing and proximal analyses for location identification, and analysis.

In addition, wide access to a G.I.S. would facilitate the sharing of data within the system.

DATA SOURCE INFORMATION SHEET

TITLE: Utility DESCRIPTION FILE

SOURCE AGENCY: Ministry of the Environment

PERSON: Emma Dolinar

TITLE: Management Information Officer

ADDRESS: 40 St. Clair Ave. W.
6th floor
Toronto, Ontario

PHONE: (416) 965-1655

DESCRIPTION: an inventory listing of all sewage and water treatment facilities operated by MOE and an inventory of sewage treatment facilities operated by municipalities

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: N/A

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: approximately 833 plants with records for describing plant characteristics

GROWTH RATE: very small - nil

DATA ITEMS: works number, works name, works type, works capacity, municipality name, municipal classification, county/district, electoral district, MOE region & district, ownership, operating authority, system class, population served, status, lat./long., UTM co-ordinates, average flow, major/minor basin number, construction

RETRIEVAL KEY(S): any of the above parameters

GEOCODE: lat./long., UTM co-ordinates, MOE region and district, county/district, electoral district

DATE OF CREATION: 1975

FREQUENCY OF UPDATE: once every 5 years

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: offices and
region from
facility construction records

USERS OF INFORMATION: regions, Water Resources Branch, MOE, public, consultants
- federal government

VOLUME/FREQUENCY OF USE:
on a weekly basis

ACCESS METHOD FOR USER: on-line retrieval as well as from generated report

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: IBM mainframe, Downsview, Ontario

SOFTWARE: GIS software (General Information System)

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: Utility Monitoring Information System

SOURCE AGENCY: Ministry of the Environment

PERSON: Emma Dolinar

TITLE: Management Information Officer

ADDRESS: 40 St. Clair Ave. West
6th floor
Toronto, Ontario

PHONE: (416) 965-1655

DESCRIPTION: chemical composition of water and sewage samples from water and sewage treatment plants operated by the province and sewage treatment plants operated by municipalities*

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: N/A

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: approximately 483,000 records

GROWTH RATE: 17,000 per month

DATA ITEMS: works number, project name, and a number of records for chemical composition of water, sewage and sludge

RETRIEVAL KEY(S): - MOE Region
- by municipality

GEOCODE: works number links to Descriptor File

DATE OF CREATION: 1975

FREQUENCY OF UPDATE: once a month

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: completed forms by facility operators

USERS OF INFORMATION: facility owner, region, Water Resources Branch, MOE, public, consultants, MNR, Hydro, Ministry of Municipal Affairs & Housing

VOLUME/FREQUENCY OF USE: once a month

ACCESS METHOD FOR USER: via on-line access through terminal or generated reports

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: IBM mainframe, Downsview, Ontario

SOFTWARE: in-house developed in COBOL

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

*information from water treatment plants operated by municipalities will soon be incorporated.

DATA SOURCE INFORMATION SHEET

TITLE: Total Utility Management and Monitoring System (TUMMIS)

SOURCE AGENCY: Ministry of the Environment

PERSON: Emma Dolinar

TITLE: Management Information Officer

ADDRESS: 40 St. Clair Ave. West
6th Floor
Toronto, Ontario

PHONE: 416-965-1655

DESCRIPTION:

TUMMIS incorporates UMIS data and checks operating results against established criteria and notes any remedial measures being undertaken by plants*

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	disc
IMAGE			
TEXT			
LIBRARY			

NOTE: N/A

SCALE: N/A

ACCURACY/RESOLUTION:
N/A

SIZE/VOLUME:
approximately 833 plants with several records per plant.

GROWTH RATE: marginal

DATA ITEMS:
in addition to UMIS data items, there exists several categories of operating criteria and remedial measures

RETRIEVAL KEY(S):
-works (facility) type
-MOE Region
-Municipality

GEOCODE: same as UMIS; ldb./long.
- UTM coordinates
- MOE Region and district
-electoral district, county district

DATE OF CREATION:
1982

FREQUENCY OF UPDATE:
every 2 months

COVERAGE/COMPLETENESS:
Ontario

SOURCE OF INFORMATION:
UMES for the operating results of the facilities

USERS OF INFORMATION:
facility operators
- MOE regions, branch
- The Project Approvals and Evaluation Branch
- Consultants
- Public

VOLUME/FREQUENCY OF USE:
once a month

ACCESS METHOD FOR USER:
on line via terminal and through generated reports

AVAILABILITY:
open

CHARGES:
none

HARDWARE AND LOCATION:
Downsview Computer Centre

SOFTWARE:
inhouse developed programs written in COBOL
- GIS (General Information Systems)

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

*At present TUMMIS is available for sewage treatment plants. This will be extended to water treatment plants in the near future.

- TUMMIS accesses UMIS for operating data hence there is no redundancy of data

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: U.M.I.S.

Municipal Sewage Unit
Water Resources Branch
M.O.E.
135 St. Clair Ave. West
Toronto, Ontario
M4V 1P5

LEGEND:
○ MANUAL PROCESS
◉ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Maintaining water and sewage treatment data	○	◉	◉	◉	◉	◉	◉	◉

AGENCY FUNCTIONS		CARTOGRAPHIC DATA						
		GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Maintaining water and sewage treatment data							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Maintaining water and sewage treatment data				□			□		□					

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Maintaining water and sewage treatment data														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Maintaining water and sewage treatment data							□			

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Maintaining water and sewage treatment data								□	□				

6.3 REGIONAL OPERATIONS DIVISION ENVIRONMENTAL APPROVALS AND PROJECT ENGINEERING

6.3.1 ADMINISTRATIVE SUPPORT SECTION

ORGANIZATION AND RESPONSIBILITIES

The primary mandate of this Section is to provide administrative support for the Environmental Approvals and Project Engineering Branch. Specifically, with regard to land-related information, this Section files and stores inventories of: municipal, provincial and private water and sewage records; industrial waste water and air records; haulers and installers of septic systems records; waste system records; and waste site records.

Included in these records are completed applications for licence or certificate, correspondence and other support documents required for approval in the Province of Ontario. A staff of approximately five complete the tasks required to record, type, file and store these records.

TASKS/SYSTEMS

1. Maintain Waste Inventories

a. Municipal and Provincial Water and Sewage Facility Records

Municipalities and the private sector are required to submit an application to the Environmental Assessment Section for approval for construction of water and sewage facilities. Applications are directed to the Administrative Support Section for recording, processing, typing and filing. A copy of this application is contained in the Appendix. Location of water and sewage facilities are given by municipality and county, district or region. Records are also stored in this Section for provincial water and sewage facilities. These facilities are totally funded by the province.

b. Industrial Waste and Air Waste Records

The Administrative Support Section stores completed application forms and Certificates of Approval for industrial water and air waste records. These files are stored alphabetically by company name. Companies are referenced by street address and town or city.

c. Haulers and Installers of Septic Systems Records

Haulers and installers of septic systems must apply for licences to the MOE regions. The application forms and a copy of the licence is stored in the Administrative Support Section. These records can be retrieved by the name of the licensee. Geographical reference includes the street address of the licensee. There are a total of 3,810 haulers and installers of septic systems licensed at this time. A sample licence is contained in the Appendix.

d. Waste System Records

The means of transporting waste materials is termed a "waste system". Each transporter of waste materials must submit an application to the MOE region. The application requests the transporter's name, the origin of the waste, the type of waste and its destination. These locations are defined by site name. There are approximately 1,200 systems in the province (see the Appendix for example).

e. Waste Site Records

A municipality applies to the respective MOE region for permission to operate a liquid or solid waste disposal site. The application includes drawings of the specific site and the surrounding area. These drawings are not in standard format and vary from application to application. At this time, the region conducts a cursory check to ensure that there are no outstanding problems with the proposed site. If the population of the area being serviced is less than 1,500, the region processes the application without consulting head office. If, however, the population serviced is greater than 1,500, the application is sent to the Administrative Support Section. When the application arrives at this Section, the Section assigns a unique identifier to the application. Once the identifier is assigned and a reference card for the application completed, the application is forwarded to the Director of the Environment. The Director prepares a letter requesting a hearing from the Assessment Board of the Ministry of the Environment. The Board then arranges a hearing and contacts persons or organizations within a 12 mile radius of the proposed site to participate in the hearing.

Once all the submissions have been analysed, the Board recommends whether or not to proceed with the development of the waste site. If it has not been determined to proceed, an engineer(s) of the Waste Management Unit reviews all the information at hand from both the application itself and submissions to the hearing. Based on this review the Waste Management Unit determines what additional work, if any, must be carried out on the site before operation may commence.

The identifier number assigned to the application comprises the municipal code from the 1971 Municipal Directory and a sequential number assigned by this Section.

For areas north of the Rainy River, the Ministry of Natural Resources T-plans are referenced. These locations are prefixed with the number seven to indicate an unorganized township followed by the first four T-plan identifier numbers, followed by a sequential location number assigned by the Section. Unorganized townships are prevalent in Northern Ontario. These are townships that do not have any municipal government infrastructure; instead, the provincial government has jurisdiction within these townships.

OBSERVATIONS

Currently, a manual system is utilized to store these records. At the regional level some piecemeal automation has begun. Lack of co-ordination of these computerized systems is currently causing problems for head office.

The municipal identifier used in the solid and liquid waste site records is not consistent with current municipal codes. The original municipal identification numbers were obtained from the 1971 Municipal Directory. Since 1971, some of these codes have been changed, and the changes have not been incorporated into these records. Problems have arisen from the use of the identifier based on the Ministry of Natural Resources T-plans. Some of these are as follows:

(i) not all of Northern Ontario is covered by townships;
(ii) not all townships have T-plans prepared for them;
(iii) T-plans are no longer being produced or maintained by the Ministry of Natural Resources.

Where no T-plan exists, the file for the waste site is assigned a unique number, a component of which identifies the district.

In the past, UTM co-ordinates were also used to identify the location of the waste disposal site in the application form; however, in many instances these have been recorded incorrectly. In an attempt to alleviate the problem of referencing a waste site, the Section is moving towards requiring locations to be referenced in UTM grids. To this end, a user education program will be required to ensure that the problem of recording incorrect co-ordinate values does not recur. The Section is considering the use of the Ontario Base Maps for obtaining the UTM co-ordinate information.

Politically sensitive issues with regard to waste management sites can present a problem to this Section, since it does not know where all waste sites are located in Ontario. Each region keeps a map with the waste sites located on them, however, there are no standards provided for locating these waste sites on the maps and the Section is not informed of their location. This becomes a particular problem, since the Administrative Support Section may not be informed of waste sites servicing areas with populations less than 1,500.

The Section must store all of its water and sewage records for 50 years before they can be destroyed. Files for waste sites must be available for 25 years after the closure of a particular site. This becomes a problem in the availability of space for storing all of these records. Currently, older records are stored in a building in Cooksville.

FUTURE NEEDS AND WANTS

In order to alleviate the problem of storing and archiving data up to 50 years, the Section has looked into microfilming these records. In this regard, the Section has purchased an Oracle Kodak microfilm system and microfilm reader. Lack of personnel resources has limited the progress of transferring these paper records to microfilm.

The Section has a strong need to standardize a method for locating and referencing the waste sites. In this regard the Section is working towards locating sites by UTM co-ordinates.

There has been some indication that these records could be made available digitally, however, a co-ordinated effort towards automating these records has not been undertaken.

G.I.S. POTENTIAL

The benefits of a G.I.S. system to this Section are limited. A G.I.S. system would provide the means for linking a number of file systems together from a number of other sections and branches within the Ministry of the Environment. A G.I.S. system would also provide the means for standardizing the geographical referencing components for the location of waste sites. This would be provided through the use of an OBM base map and UTM co-ordinates.

DATA SOURCE INFORMATION SHEET

TITLE: Waste Site Records

SOURCE AGENCY: Ministry of the Environment

PERSON: Doras Kemp

TITLE: Manager, Administrative Support Section

ADDRESS: 135 St. Clair Ave W.
Toronto, Ontario
M4V 1P5

PHONE: (416) 965-6421

DESCRIPTION: a manual file system for the storage of information relating to liquid or solid waste sites

FORMAT:

	M	A	MEDIA
MAP	X		paper
TABULAR			
IMAGE			
TEXT	x		applications
LIBRARY			

NOTE: N/A

SCALE: N/A

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: 1,500 sites

GROWTH RATE: less than 10 per year

DATA ITEMS:
- site location - township
  town
  concession
  lot
- site characteristis
  - present land use
  - official plan designation
  - zoning category
  - land use of adjoining land

waste category

RETRIEVAL KEY(S):
- township, concession and lot
- application number consisting of municipal code and sequential number

GEOCODE: - township, lot & concession and municipal code

DATE OF CREATION: 1971

FREQUENCY OF UPDATE: continuous

COVERAGE/COMPLETENESS: entire province

SOURCE OF INFORMATION: applications for waste sites

USERS OF INFORMATION: Ministry of the Environment
- general public
- other ministries
- lawyers

VOLUME/FREQUENCY OF USE: constant/daily

ACCESS METHOD FOR USER: manual via card index given township or files via file number

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: storage shelves, microfilm unit (not currently used)

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:
ADMINISTRATIVE SUPPORT SECTION
ENVIRONMENTAL APPROVALS & PROJECT ENGINEERING BRANCH
REGIONAL OPERATIONS BRANCH
MINISTRY OF THE ENVIRONMENT

LEGEND:
○ MANUAL PROCESS
◉ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

		TABULAR DATA								CARTOGRAPHIC DATA																				
										GENERATION						STORAGE	MANIPULATION / ANALYSIS													
																	GEOMETRIC ANALYSIS													
	AGENCY FUNCTIONS	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Storing Records for Waste Sites, & Water & Sewage Facilities	○	◉	◉	◉			◉	◉							○														

		CARTOGRAPHIC DATA																							
		MANIPULATION / ANALYSIS														DISPLAY									
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION				
	AGENCY FUNCTIONS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Storing Records for Waste Sites, & Water & Sewage Facilities													○											

		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	AGENCY FUNCTIONS	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Storing Records for Waste Sites, & Water & Sewage Facilities						○	○						

6.3.2 PROJECT CONTROL SECTION UTILITY PROJECT MANAGEMENT SYSTEM

ORGANIZATION AND RESPONSIBILITIES

The Environmental Approvals and Project Engineering Branch is responsible for issuing the Certificate of Approvals for provincially subsidized municipal waterworks projects. This Branch also provides engineering assistance to municipalities, where required, for the design and construction of water and sewage facilities. The mandate of the Project Control Section is to evaluate municipal applications for waterworks construction grants and to provide monthly status reports to the Branch through the use of its Utility Project Management System regarding construction progress and the financial status of the construction project itself. This Section oversees the administration of a $150 million budget, of which approximately $70 million is provided directly to the municipalities in the form of transfer payments for these projects, and approximately $80 million is in the form of direct construction payments. This Section also monitors money provided for water and sewage facilities through the BILD Program, a parallel federal program, and a program directed to northern communities in Ontario.

The Project Section was created in 1974 to monitor these water and sewage facility construction projects. In 1975, a special report by the consulting firm Woods Gordon recommended the development of a project monitoring program, called the Utility Project Management System. Work on this program began in 1975 and was completed and operational in 1978. This program provided a mechanism for critical path monitoring of projects. Unfortunately, in 1978 it was decided by the Branch to no longer be directly involved with these construction programs. Rather, the Branch would only be involved with the projects through the grants portion of this program. As a result of this, the Utility Project Management System is not being currently used. Since there are only 10 to 15 construction projects in which the Branch is directly involved, it is felt that these can be monitored through the use of manual record systems.

There are, however, 300 to 400 grants that must be monitored every year, a level which is expected to remain stable for some time to come. Due to the large number of grants that must be monitored every year, it has been suggested that the Utility Project Management System be modified to be used as a monitoring tool for these grants. At present, the grant records are maintained in a manual file. Once the grants have been exhausted for a particular project, the record is archived and is no longer deemed useful. To this end, there are only about 300 to 400 active records maintained on an annual basis by this Section.

TASKS/SYSTEMS

1. Manage Utility Project Records

The progress by which a municipality obtains a water/sewer facility construction grant is as follows:

1. The municipality first makes a formal application to the Branch for a particular waterworks or sewage facility project. The Branch then prioritizes the applications based on certain criteria that must be met by the municipalities. The funds are then provided to the prioritized list of municipalities until the funds are exhausted.

2. These applications and any subsequent records are identified by the municipal code, the particular project number as well as the project name. Copies of several applications as well as a data form from the Utility Project Management System are contained in the **Appendix**. The grant applications and grant records are manually filed and referenced by municipal location. These are filed in a cabinet, alphabetically.

An AES word processor is utilized to process, store and generate reports of summary data contained in the individual grants records. Some basic data manipulation and statistical analysis capabilities are provided through this AES word processing system and these are used when the reports are generated.

OBSERVATIONS

One of the problems experienced when the Utility Project Management System was operational for a short duration of time, was the amount of output generated on a monthly basis. It was felt that the amount of data output for the 100 or so projects that were being monitored at one time was too great.

This Section is also responsible not only for monitoring the grants that have been issued, but also for authorizing the funding and processing of grants claims. The Branch has a staff of 20 engineers who provide management services in regard to the construction projects. Approximately 20% of the smaller municipalities which do not have qualified staff on hand to look after the construction projects will ask the Branch for assistance in this regard. Approximately 80% of the Section's time, however, is spent in administering the grants records.

This Section is also responsible for monitoring another program for the rehabilitation of septic tanks and wells.

FUTURE NEEDS AND WANTS

The Project Control Section would like to see the Utility Project Management System modified in order to be used as a monitoring tool for the grants program. This would incorporate an automated grants record keeping system and would allow access by a variety of keys to the information contained in these records. Specifically, the Section would like to see data retrieval by such items as facility types, location, particular stage of project completion and a dollar value of a project.

G.I.S. POTENTIAL

This Section would benefit from an automated record keeping system for its grants applications and grants records. It does not appear that this Section would benefit from digital maps.

DATA SOURCE INFORMATION SHEET

TITLE: Project Utility Information System

SOURCE AGENCY: Ministry of the Environment
PERSON: C. E. Letman
TITLE: Manager, Project Control
ADDRESS: 40 St. Clair Ave W.
Toronto, Ontario

PHONE: (416) 965-1371

DESCRIPTION: inventory of municipal water and sewage projects administered by this Section

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 100 projects

GROWTH RATE: 0

DATA ITEMS: applicant name, project description, project number, region, municipal code, listing of costs

RETRIEVAL KEY(S): project number, municipal code number

GEOCODE: municipal code

DATE OF CREATION: 1978

FREQUENCY OF UPDATE: currently not being updated

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: applications submitted

USERS OF INFORMATION: internal to this Section

VOLUME/FREQUENCY OF USE:
- daily until completion of projects
- ad hoc queries for politicians

ACCESS METHOD FOR USER: phone, terminal

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: IBM mainframe, Downsview

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
not currently being used

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Utility Project Management System

LEGEND:
- ○ MANUAL PROCESS
- ● NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

TABULAR DATA

AGENCY FUNCTIONS		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Manage Utility Projects	○	●	●	●	●			●

CARTOGRAPHIC DATA — GENERATION / STORAGE

AGENCY FUNCTIONS		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Manage Utility Projects							

CARTOGRAPHIC DATA — MANIPULATION / ANALYSIS — GEOMETRIC ANALYSIS

AGENCY FUNCTIONS		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Manage Utility Projects														

CARTOGRAPHIC DATA — MANIPULATION / ANALYSIS — NETWORK ANALYSIS / DIGITAL TERRAIN MODELLING / QUERY

AGENCY FUNCTIONS		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Manage Utility Projects														

CARTOGRAPHIC DATA — DISPLAY — COMPOSITION / PRESENTATION

AGENCY FUNCTIONS		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Manage Utility Projects										

IMAGE DATA / TEXT DATA / BUSINESS GRAPHICS DATA / BIBLIOGRAPHIC DATA / REFERENCE TO DATA TYPES

AGENCY FUNCTIONS		IMAGE DATA: COLLECTION	IMAGE DATA: STORAGE	IMAGE DATA: RETRIEVAL	TEXT DATA: ENTRY/EDIT	TEXT DATA: COLLECTION	TEXT DATA: STORAGE	TEXT DATA: RETRIEVAL	BUSINESS GRAPHICS DATA: ANALYSIS	BUSINESS GRAPHICS DATA: DISPLAY	BIBLIOGRAPHIC DATA: INDEXING	BIBLIOGRAPHIC DATA: STORAGE	BIBLIOGRAPHIC DATA: RETRIEVAL	REFERENCE TO DATA TYPES
1	Manage Utility Projects													

7 MINISTRY OF GOVERNMENT SERVICES

7.1 OVERVIEW

The Ministry of Government Services provides support to the other provincial ministries. These services include Computer, Accommodation, Communication, Supply and Housekeeping Services. The Ministry is divided into six divisions, as portayed in the Organization Chart shown in Figure 7.1-A. The most relevant of the User Needs Study being the Accommodation Division. The Accommodation Division provides design, leasing and property management services to government owned and occupied facilities. It comprises six branches. Of these six branches, the Program Management Branch and the Property Development Branch are of particular interest in regard to land-related information.

The Accommodation Management Information System Unit of the Program Management Branch is responsible for maintaining an inventory of government properties, buildings and leases. The inventory is used to facilitate goverment property allocation and management.

The Property Development Branch is responsible for ensuring that the government accommodation portfolio is administered for optimum benefit to the client-ministries. This is largely a planning function and, as such, uses a great deal of land-related information including the AMIS data base.

MINISTRY OF GOVERNMENT SERVICES

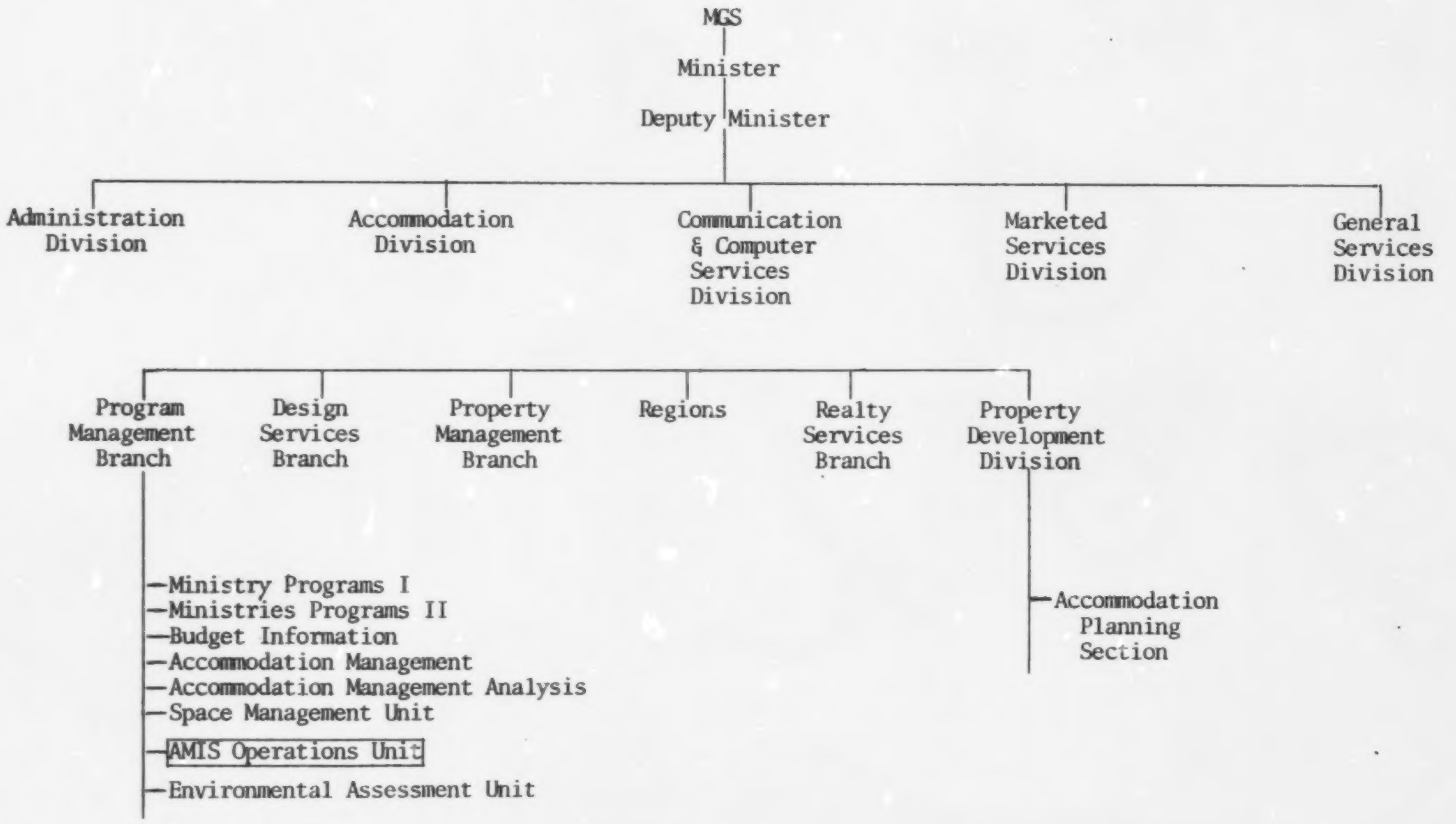

MGS
Minister
Deputy Minister
Administration Division
Accommodation Division
Communication & Computer Services Division
Marketed Services Division
General Services Division
Program Management Branch
Design Services Branch
Property Management Branch
Regions
Realty Services Branch
Property Development Division
Ministry Programs I
Ministries Programs II
Budget Information
Accommodation Management
Accommodation Management Analysis
Space Management Unit
AMIS Operations Unit
Environmental Assessment Unit
Accommodation Planning Section

Figure 7.1-A

7.2 ASSISTANT DEPUTY MINISTER, ACCOMMODATION

7.2.1 MANAGEMENT SYSTEMS AND SERVICES SECTION
AMIS OPERATIONS UNIT
ACCOMMODATION MANAGEMENT INFORMATION SYSTEM (AMIS)

ORGANIZATION AND RESPONSIBILITIES

The Accommodation Management Information System (AMIS) is an automated inventory system for provincially-owned and leased land, buildings and their occupants. It does not maintain an inventory of the right-of-ways, which are maintained by the Ministry of Transportation and Communications or Ontario Hydro. The AMIS Unit is staffed by eight people.

The orginal purpose of AMIS was to integrate several land, building and occupant inventory programs that the provincial government had in operation. In so doing, the intent was to streamline and standardize the inventory record keeping process.

TASKS/SYSTEMS

1. Maintain AMIS Inventory

The main task of the AMIS Unit is to maintain an inventory of:

a. provincially-owned and leased land;
b. provincially-owned and leased buildings;
c. accommodation data.

a. Provincially-owned Land Inventory

This automated inventory consists of 3,500 government-owned installations. An installation can comprise one or more parcels of land. The actual purchase of any land is carried out by the Realty Services Branch of the Ministry of Government Services. The AMIS Unit receives a letter of intent of purchase from the Realty Services Branch and assigns a number to the particular installation. These installations are assigned a sequential number which is prefixed with the letter N.

Once the land has been purchased, an AMIS land record formatted sheet is filled out. This sheet contains land-related information such as installation address, municipality name, the municipal index and electoral riding, the county name, the Registry Office code and land use description data, such as outdoor parking. Another location identifier on the sheet is the geographic co-ordinates; however, at this time this is not being utilized. This data is then entered into AMIS. A copy of this formatted sheet is included in the Appendix.

The AMIS Unit also receives a duplicate copy of the registered deed once the transactions have been completed. This deed copy is stored in a manual file for future reference, as required.

b. Installation Building Inventory

There are 9,000 government buildings in the AMIS inventory. The AMIS Unit is notified of new buildings that are to be input into the inventory system from:

1) the Design Services Branch in the Ministry of Government Services,

2) client-ministries, such as Ministry of Natural Resources and the Ministry of Transportation and Communications, and

3) the Ministry of Government Services Region and District Offices.

The information is filled out on a formatted sheet and the buildings are coded sequentially, the number being prefixed with the letter B. A copy of the formatted sheet is contained in the Appendix.

c. Leasing Inventory

The AMIS Unit maintains an inventory of 1,300 premises owned by the private sector and leased by the provincial government. This information is provided by the Leasing Section of the Ministry of Government Services. The information contained in this leasing inventory is similar to that of the land record and building record with the addition of pertinent leasing information, such as lease expiry date, payments, etc. The leases are also numbered sequentially and prefixed with the letter L.

d. Accommodation Data

One of the tasks of the AMIS Unit is to provide to the various client-ministries a list of the accommodation data which includes the amount of space utilized by the occupants of buildings owned and leased by the ministries. Every year on September 30, reports are sent to the client-ministries which contain information on the buildings, the leases and the accommodation information, such as the amount of space being utilized. This report must be validated by the client-ministries and returned to the AMIS Unit.

2. Produce Maps

The AMIS Unit produces and maintains maps for the installations that are recorded on AMIS. Of the 3,500 installations, approximately 80% of the maps have been completed. These maps are produced at a variety of scales, for example, 1" = 100', 1" = 200' and 1" = 400'. The installation map shows the boundary of the installation, the buildings located on the installation sites and some descriptive data associated with the buildings and installation.

In addition to these maps, the AMIS Unit also produces, when requested, small scale maps of cities or areas that show the installation and/or buildings within a user specified area. The AMIS Unit will use maps from a variety of sources in order to display this land and building information. Some of the maps utilized are city maps provided by the various cities, OBM maps, where available, and maps provided by other ministries.

SYSTEMS

The inventory data is maintained on three files. The land, building and lease data is maintained in one file; the accommodation records are maintained on a second file and the financial data related to leases and used for budget projections is maintained on a third file, called the Project Master File. This information is accessed via a batch processing mode. The editing and retrieval programs were written in-house in COBOL. The Mark IV report generator program is utilized for providing a formatted output.

These files and programs reside on the Queen's Park IBM 370/168 mainframe computer.

The information within the files can be retrieved in a variety of formats such as installation by county and occupant, or installations over 400 acres, and so forth.

OBSERVATIONS

AMIS is looked upon as a space, building and lease management tool.

There is a link via the computer between the Accommodation Management Information System and the Financial Information System (FIS) of the Ministry of Government Services. This allows the AMIS or FIS Unit to correlate expenditures by a particular building, installation or floor space.

To expand the usage of AMIS by others, the Unit is prototyping a project control program which utilizes Model 204 software. The type of project control information that one will be able to access and monitor will include the sales of a particular parcel of land, the near closing of a sale, and so forth.

FUTURE NEEDS AND WANTS

The Manager of the AMIS Unit expressed no major needs or wants in regard to AMIS, however, three minor potential desires were mentioned. These are:

1. the automation of the history of purchased parcels for the installations,

2. the use of digital plans to display the installations and buildings in order to facilitate updating of these plans, and

3. utilizing the POLARIS unique identifier for individual installations.

G.I.S. POTENTIAL

The maps that are currently being produced manually could be produced in a digital format which would allow them to be more easily updated and be referenced to the inventory files. In this situation, if inventory information is accessed, a corresponding map can be provided on a terminal screen. Conversely, if a digital map were displayed on a terminal screen, the information corresponding to that map could be accessed by indicating on the terminal screen the particular installation or building for which information is desired. Leasing, accommodation and ownership information could be displayed in this manner.

If automated mapping capabilities were available, the Section could automatically carry out certain procedures now done manually, such as: cartographic data compilation, COGO, update, storage and management, geometric analyses (e.g., polygon overlay, polygon dissolve and windowing), and cartographic display techniques.

DATA SOURCE INFORMATION SHEET

TITLE: A.M.I.S. Inventory Maps

SOURCE AGENCY: AMIS Unit
PERSON: Ron Rossetto
TITLE: Manager of AMIS Unit
ADDRESS: Macdonald Block
Room M1-21
Queen's Park
Toronto
PHONE: (416) 965-6745

DESCRIPTION: site maps of installations showing boundaries and buildings

FORMAT:

	M	A	MEDIA
MAP	x		Mylar
TABULAR			and paper
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: variance ea. 1"=100', 1"=200' and 1"=400'

ACCURACY/RESOLUTION: drafting standard accuracy

SIZE/VOLUME: approx. 2,500 maps and when completed 3,500

GROWTH RATE:

DATA ITEMS:
- -installation limits and dimensions
- -building outlines
- -streets
- -some descriptive data
- -installation code number

RETRIEVAL KEY(S): installation code number

GEOCODE: installation code number

DATE OF CREATION: 1976

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS: 80% of all installations across the province

SOURCE OF INFORMATION:
- registered plans
- site visits to measure the buildings if required and ministry office

USERS OF INFORMATION:
- client ministries
- internal use by MGS for planning

VOLUME/FREQUENCY OF USE: when graphic information is required in addition to the inventory data

ACCESS METHOD FOR USER: manual access by map code number

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: flat files located in Macdonald Block, Queen's Park

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.) none

DATA SOURCE INFORMATION SHEET

TITLE: A.M.I.S. - Land Inventory

SOURCE AGENCY: AMIS Unit

PERSON: Ron Rossetto

TITLE: Manager of AMIS Unit

ADDRESS: Macdonald Block
Room M1-21
Queen's Park
Toronto, Ontario

PHONE: (416) 965-6745

DESCRIPTION: an inventory of provincially owned land

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 3,500 installations

GROWTH RATE:

DATA ITEMS: installation number, transaction date, street address, property name, municipal index, electoral riding, registry office code, county, MGS region & district, installation area, parking data, misc. description registration data, etc.

RETRIEVAL KEY(S): installation number, county municipality, municipal index, MGS regions and districts. In Metro Toronto - address

GEOCODE: MGS district & region, county, municipality, municipal index, installation number

DATE OF CREATION: 1976

FREQUENCY OF UPDATE: twice a month

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Realty Service Branch of MGS

USERS OF INFORMATION: internal to MGS for planning, all provincial ministries

VOLUME/FREQUENCY OF USE: reports generated and distributed annually, 6 - 7 ad hoc reports a year

ACCESS METHOD FOR USER: computer generated reports. Supplied annually or on request. These are batch processed.

AVAILABILITY: open to provincial ministries, not available to public

CHARGES:

HARDWARE AND LOCATION: Queen's Park Computer Centre, IBM 370/168 Queen's Park, Toronto

SOFTWARE: Mark IV report generator, in-house update and edit software written in Cobol

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: A.M.I.S. - Building Inventory

SOURCE AGENCY: AMIS Unit
PERSON: Ron Rossetto
TITLE: Manager of the AMIS Unit
ADDRESS: Macdonald Block
Room M1-21
Queen's Park
Toronto, Ontario
PHONE: (416) 965-6745
DESCRIPTION: an inventory of all provincially owned buildings

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 9,000 buildings

GROWTH RATE:

DATA ITEMS: installation number, building number, transaction date, building name, street address, building use, interior & exterior details, acquisition date, cost, maintenance costs, floor area, market value, rentable space, and other information related to the building

RETRIEVAL KEY(S):
- building code, number
- street address (only in Toronto)

GEOCODE:
- street address
- installation number

DATE OF CREATION: 1976

FREQUENCY OF UPDATE: twice a month

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Design Services Unit of MGS, client ministries, e.g. MTC, MNR, MGS region and district offices

USERS OF INFORMATION: internal to MGS, all provincial ministries, e.g. MNR, MTC, MCCR, MAH, etc.

VOLUME/FREQUENCY OF USE: reports generated annually, 6 - 7 ad hoc reports per year

ACCESS METHOD FOR USER: reports produced via batch processing

AVAILABILITY: open to provincial ministries, not available to general public

CHARGES:

HARDWARE AND LOCATION: Queen's Park Computer Centre, IBM 370/168 Queen's Park, Toronto

SOFTWARE: Mark IV report generator, in-house update and edit software written in Cobol

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: A.M.I.S. - Lease Inventory

SOURCE AGENCY: AMIS Unit

PERSON: Ron Rossetto

TITLE: Manager of AMIS Unit

ADDRESS: Macdonald Block
Room M1-21
Queen's Park
Toronto, Ontario

PHONE: (416) 965-6745

DESCRIPTION: an inventory of all provincially owned premises leased to the provincial government

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 1,300 leased premises

GROWTH RATE:

DATA ITEMS: same as land and building inventory plus lease data including rent, expiry date of lease, lease number

RETRIEVAL KEY(S): lease number
Metro Toronto - address

GEOCODE: MGS district & region, municipality, county, municipal index

DATE OF CREATION: 1976

FREQUENCY OF UPDATE: twice a month

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Leasing Section of MGS

USERS OF INFORMATION: internal to MGS, all provincial ministries

VOLUME/FREQUENCY OF USE: reports generated and distributed annually, 6 - 7 ad hoc reports a year

ACCESS METHOD FOR USER: computer generated reports supplied annually or on request. These are batch processed.

AVAILABILITY: open to provincial ministries, not available to public

CHARGES:

HARDWARE AND LOCATION: Queen's Park Computer Centre, IBM 370/168, Queen's Park, Toronto .

SOFTWARE: Mark IV report generator, in-house edit and update software written in Cobol

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: A.M.I.S.
Accommodation Management
Information System

LEGEND:
- ○ MANUAL PROCESS
- ● NOW DONE MANUALLY WANT TO AUTOMATE
- ◉ AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS			TABULAR DATA							
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
	1'	Maintain A.M.I.S.		●	●	●	●			●
		inventory								
	2	Drafting maps								

AGENCY FUNCTIONS			CARTOGRAPHIC DATA						
			GENERATION						STORAGE
			COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
	1'	Maintain A.M.I.S.							
		inventory							
	2	Drafting maps	●		●	●			●

AGENCY FUNCTIONS			CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS													
			GEOMETRIC ANALYSIS													
			POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
	1'	Maintain A.M.I.S.							●							
		inventory														
	2	Drafting maps			●				●							

AGENCY FUNCTIONS			CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS													
			NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
			OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
	1'	Maintain A.M.I.S.													●	●
		inventory														
	2	Drafting maps														

AGENCY FUNCTIONS			CARTOGRAPHIC DATA – DISPLAY									
			COMPOSITION					PRESENTATION				
			QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
	1'	Maintain A.M.I.S.										
		inventory										
	2	Drafting maps	●		●	●	●	●		●		●

AGENCY FUNCTIONS			IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
			COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
	1'	Maintain A.M.I.S.													
		inventory													
	2	Drafting maps													

7.2.2 PROPERTY DEVELOPMENT DIVISION ACCOMMODATION PLANNING SECTION

ORGANIZATION AND RESPONSIBILITIES

The primary responsibilities of the Accommodation Planning Section are:

1. to optimize and rationalize the provincial government's land and building portfolio through the development of a corporate strategic accommodation planning process;

2. to develop and take a leading role in the creation of corporate accommodation policies and new facilities; and

3. to allocate space within provincially-owned facilities.

Specifically, these responsibilities relate to replacements, additions and management of the provincial land and building portfolio. Primarily, the Section has a planning and development function. A current staff of seven complete the tasks required to fulfill these responsibilities.

It should be noted that this Section was undergoing reorganization during the course of the User Needs Study effort.

TASKS/SYSTEMS

1. Allocate Office Space

The Branch reviews and analyses requests for office space from client-ministries. An examination of existing inventories is carried out through the use of the AMIS (Accommodation Management Information System) listing. From this inventory of existing facilities, the Branch manually choses an appropriate site or facility for the client-ministry. The site which can be either land or existing office space is then allocated to that ministry.

A Space Options program was developed by a consultant to aid in decision making by examining the cost of alternative locations. A Cost Projections program is also used to project leasing costs over a number of years. This is used in determining the cost/benefit of purchasing property for capital construction rather than leasing. A Visicalc program is also used to carry out feasibility analysis of various alternatives.

Analysis of a specific request may generate the need to develop comprehensive study plans relating to specific locations (or municipalities) and encompasses the complete array of accommodations owned or leased by the province. Such plans could be short-term in nature to solve specific problems, or strategic in nature to establish a framework for future decisions.

2. Optimize Provincially-owned Land and Building Portfolio

The Branch is now charged with the responsibility for conducting long-range strategic land management plans. They identify parcels of land for development or disposal by examining the existing portfolio from AMIS and current and expected accommodation needs. One example of this assessment activity is the recommendations put forth by the Metroplan. For example, one such recommendation deals with the decentralization of provincial offices to suburban sites within Metropolitan Toronto.

In planning for accommodations, the Branch must have access to zoning, land use and adjacent property data. As well, the Branch uses local and municipal maps to superimpose provincially-owned lands for geographic reference. The other units within the Property Development Division, such as the Design Services Section, the Leasing Services Section and the Project Management Section, provide support services in planning for the provision of future facilities or the disposition of existing surplus facilities.

OBSERVATIONS

Much of the information required by the Planning Branch in carrying out its mandate is not easily accessible; for example, zoning information must be obtained from the municipality and adjacent property information is not always available without a site visit.

A large amount of the data available through the AMIS data base is not applicable to this Branch's needs. As a result, the Branch is developing an APIS (Accommodation Planning Information System) data base. APIS is designed to retrieve key planning information such as location and amount of provincial office space available from the AMIS data base and employee information from the IPPEBS data base (the government payroll data base). APIS massages these two data bases into a format consistent with the planning function. The APIS data base, specifically, will provide: analysis of space, lease expiring functions, municipal space ranking, space inventory and employee/space analysis and summaries. The APIS data base will be available on an on-line basis whereas AMIS is only available through batch processing.

FUTURE NEEDS AND WANTS

The Branch has a need to analyse existing provincial land holdings, especially, in those instances where some holdings may have been initially acquired at low cost and which have appreciated substantially due to changing land use patterns. It is essential that the government's lands be put to their best use. A system is therefore required to allow a regular review of holdings to take place, but with minimal resources and staff input. Thus, the Branch has a need for on-line access to a number of data sources including zoning information, adjacent property data, etc. As planners, access to many information sources is a necessity. The provision of such information on-line would facilitate the planning functions more effectively and efficiently. There is also a need for consistent base map coverage (e.g., OBM mapping) in Ontario. This would be used for superimposition of thematic data, specifically, the government's facility locations, zoning and land use.

G.I.S. POTENTIAL

A number of generic software procedures would be beneficial to this Branch in carrying out their planning functions, specifically:

1. a polygon overlay capability to overlay zoning information on proposed facility locations to determine suitability for proposed, or future development;
2. point in polygon for determining the number of facilities within a given area;
3. windowing of facility areas required for geographical referencing;
4. proximal analysis to determine adjacent property information;
5. spatial and attribute queries; and
6. polygon mapping capability at a variety of scales in order to display portfolio inventories.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: STRATEGIC PLANNING UNIT

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA: COMPILATION	TABULAR DATA: DATA/ENTRY	TABULAR DATA: UPDATE	TABULAR DATA: STORAGE/MANAGEMENT	TABULAR DATA: DATA MANIPULATION	TABULAR DATA: STATISTICAL ANALYSIS	TABULAR DATA: ON-LINE QUERY	TABULAR DATA: REPORT GENERATION	CARTOGRAPHIC DATA, GENERATION: COMPILATION	GENERATION: DIGITIZING/EDIT	GENERATION: COGO	GENERATION: UPDATE	GENERATION: MAP JOIN / EDGE MATCH	GENERATION: ADDRESS GEOCODING	STORAGE: STORAGE/MANAGEMENT
1 Allocation of space					●	●	○	□	◐						○
2 Optimization of provincially owned lands and buildings	○				●	●	◐	◐	◐					□	○

AGENCY FUNCTIONS	CARTOGRAPHIC DATA, MANIPULATION / ANALYSIS, GEOMETRIC ANALYSIS: POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Allocation of space			◐											
2 Optimization of provincially owned lands and buildings	□			◐			◐		◐	◐	●	□	□	□

AGENCY FUNCTIONS	NETWORK ANALYSIS: OPTIMAL PATH SELECTION	NETWORK ANALYSIS: FLOW SIMULATION	NETWORK ANALYSIS: TIME/DISTANCE DISTRICTING	DIGITAL TERRAIN MODELLING: SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	QUERY: SPATIAL QUERY	QUERY: ATTRIBUTE QUERY
1 Allocation of space													◐	◐
2 Optimization of provincially owned lands and buildings													◐	◐

AGENCY FUNCTIONS	DISPLAY, COMPOSITION: QUERY/WINDOW	COMPOSITION: GENERALIZATION	COMPOSITION: SCALE CHANGE	COMPOSITION: COSMETIC ENHANCEMENT	COMPOSITION: GRAPHIC SUPERIMPOSITION	PRESENTATION: POLYGON MAPPING	PRESENTATION: POINT MAPPING	PRESENTATION: LINE MAPPING	PRESENTATION: SURFACE MAPPING	PRESENTATION: ANNOTATION/TEXT
1 Allocation of space	◐		◐		◐	◐	◐	◐		◐
2 Optimization of provincially owned lands and buildings	◐		□	□	◐	◐	◐	◐		◐

AGENCY FUNCTIONS	IMAGE DATA: COLLECTION	IMAGE DATA: STORAGE	IMAGE DATA: RETRIEVAL	TEXT DATA: ENTRY/EDIT	TEXT DATA: COLLECTION	TEXT DATA: STORAGE	TEXT DATA: RETRIEVAL	BUSINESS GRAPHICS DATA: ANALYSIS	BUSINESS GRAPHICS DATA: DISPLAY	BIBLIOGRAPHIC DATA: INDEXING	BIBLIOGRAPHIC DATA: STORAGE	BIBLIOGRAPHIC DATA: RETRIEVAL	REFERENCE TO DATA TYPES
1 Allocation of space								●	●				
2 Optimization of provincially owned lands and buildings								●	●				

8 MINISTRY OF HEALTH

8.1 OVERVIEW

The Ministry is responsible for ensuring the good health of the Ontario public by administering such programs as health insurance, care for the mentally ill, extended health care, home care services, the regulation of hospitals and nursing homes, and drug benefit. The Ministry operates psychiatric hospitals and medical laboratories and also co-ordinates ambulance services.

To carry out this mandate, a number of divisions have been created. The divisions relevant to this study include the Emergency Health Services Division, Hospital Emergency Services and Ambulance Services, and the Information Systems Division.

The **Emergency Health Services Division** provides a focus for planning, development and administration of all emergency health-related matters. This includes direct program responsibility for land ambulance service, air ambulance service and hospital emergency services.

The functions of **Hospital Emergency Services** include maintaining and improving the emergency preparedness and disaster response capability of the Ministry and its related health resources; offering consultative assistance and experience to field resources in hospital and other health care facilities such as public health units and ambulance services; and providing liaison with other ministries and levels of government in the area of health resources' emergency preparedness.

The **Ambulance Services Branch** is responsible for issuing licences to and inspecting ambulance services in Ontario. It operates a training program for volunteer and part-time drivers/attendants, and is responsible for central examination of graduates of the ambulance and emergency care program in community colleges. It provides OHIP approval and guidance for out-of-province and air ambulance transfers. It also operates the Ontario Ambulance Services Information System.

The **Management Systems Branch** within the **Information Systems Division** advises the Ministry and related agencies on all aspects of automatic data processing services. It provides systems development and maintenance, consulting, data entry and data control services for the Ministry. It develops policy to guide the effective use of computers and computer applications in hospitals.

8.2 EMERGENCY HEALTH SERVICES AMBULANCE SERVICES SECTION

ORGANIZATION AND RESPONSIBILITIES

The Ambulance Services Section of the Ontario Emergency Health Service (EHS) has the responsibility of providing transportation (and medical assistance) for injured (or convalescing) patients to or from medical facilities in the province.

The Section is divided into two major organizational components:

- Land Ambulance
- Air Ambulance

Both the Land and Air Ambulance Sections are further segmented into two general functional entities:

- Dispatching ambulances, fleet operation and associated administration.
- Performing statistical analysis.

1. Air Ambulance

The "air force" is comprised of three helicopters which are located at Thunder Bay, Sudbury, and Toronto. Two fixed wing aircraft are based at Sioux Lookout and Timmins. Additionally, the use of other properly equipped and approved aircraft are utilized on an "as required" basis.

During fiscal year 82/83 the Air Ambulance Section was involved with approximately 8,200 patient transfers.

The northern part of Ontario is the region where the Air Ambulance Service is primarily utilized as lack of roads, winter conditions and distance can preclude land ambulance support.

The majority of the patient transfers are within provincial boundaries. However, in some situations, interprovincial and international transfers are approved with the patient being relocated to major hospitals here in Ontario.

2. Land Ambulance

The Land Ambulance Section is, in terms of budget and assigned personnel, the largest operating unit within the Emergency Health Service Group. There are (on average) 3,500 personnel assigned to support the 24 hour/day, 365 day/year ambulance service requirements within the Province of Ontario. In some cases, the staff is directly employed by the province while in others the staff is employed by hospitals, municipalities or are supplied on a contract basis by private industry. Ambulance drivers, medical attendants, paramedical personnel, dispatchers and administration staff comprise the major job classifications. The current annual rate of activity for the Land Ambulance Section indicates they are responding to approximately 675,000 calls a year.

TASKS/SYSTEMS

1. Dispatching Ambulances

In most cases, the "initial patient pick-up" is made by land ambulances, e.g., traffic accidents. The patient is usually taken to the nearest medical facility which, in some cases, cannot address the severity or type of injury. In these circumstances, when the patient is in stable condition, when the referring doctor has arranged the transfer to a base hospital and distance dictates, the Air Ambulance Service is called upon to provide transportation. The dispatch function co-ordinates the move including determining the aircraft, airport, staff, etc. Medical condition, distance, time, and the aircraft capabilities all become part of the equation.

During and after patient drop-off, various administrative forms are completed indicating such items as the individual's name, pick-up date, time, location, drop-off date, patient condition, etc.

In other situations, such as helicopter utilization for initial patient pick-up, as in the case of aircraft crashes in wilderness areas, the communications and interaction between the decentralized land dispatch centres and air dispatch is critically important. Similarly, information problems relating to large scale disasters such as train wrecks involving dangerous chemicals or nuclear power plant evacuations, pose similar problems but on a greater scale. The question: "where is the accident location exactly?" becomes the most critical of the communication elements.

The air and land ambulance dispatching function subsists on two mapping systems that do not correlate with each other and do not suffice. The principal system which is used throughout Emergency Health Services is dependent on a unique grid referencing system. It was initially defined by overlaying a series of grid squares on the best maps of Ontario available at the time (1968-1970).

The grid structure is keyed as follows:

	Identifier
100 x 100 mile grid squares	xx-----
10 x 10 mile grid within the above major grid	--xx---
1 x 1 mile grid within the above 10 x 10 mile grid	----xx-
1/4 x 1/4 mile grid within the 1 x 1 mile grid	------x

The mile quadrants are defined clockwise from the position y axis.

Obviously, the various grid lines intersect municipal boundaries, townships, streets, lots, concessions, houses, etc. It is inaccurate and is the subject of varied interpretations. It is also the source of many problems and inefficiencies. It is important to note that dispatch personnel have (and are) continually improving to overcome map deficiencies while maintaining excellent levels of service.

This 7-digit identifier forms the basis on which dispatchers define the location of where the patient(s) will be picked up (land ambulances, helicopter or fixed wing) and where they will be dropped off. 14 27 09 4 identifies the 14th 100 x 100 mile grid, the 27th 10 x 10 mile grid within the 14th major grid, etc.

The other mapping systems used by the Air Ambulance Service is the Federal Aviation Series and geographic location is expressed in latitude/longitude.

The management of the provincial land ambulance organization recognizes some major differences in comparison to the air ambulance operation. For instance, the land ambulance organization has, for discussion purposes, four levels of dispatch/fleet operations that are primarily population and geographically oriented:

a. Metro Toronto which has approximately 120 ambulances covering an 800 square mile area with a dispatch centre that is quite sophisticated. For instance, they are implementing an enhanced Computer Assisted Dispatching (CAD) system. Additionally, such activities as dynamically adjusting back-up ambulances and crews in adjacent areas to minimize overall response times are part of their ongoing procedures. They also have an extensive communication network to aid in their operation.

b. Metropolitan areas such as Windsor, Hamilton, Ottawa, etc. that are large enough to have full time, around the clock staffing as well as having access to nearby major medical facilities fall within this category. They are not large enough (or have been unable to justify adequate funding to date) to upgrade their operational capability to that of Metro Toronto.

c. Smaller (more independent) operations of combined dispatch/fleet operations that cover the lower latitudes of Ontario and that are assigned still smaller staffing levels. The lack of accurate support maps for these rural areas is causing problems.

d. Remote land ambulance operations that are in the higher latitude of Ontario. Their remoteness and the size of the geographical territory present many different kinds of operational problems. Their equipment complement and types of reference maps also tend to be less complete. They also interface extensively with the air ambulance operations.

2. Performing Statistical Analysis

The 7-digit geographical grid definition forms the locational basis of a statistical analysis system which is referred to by the acronym OASIS. All statistical analysis is done using the OASIS system software developed by the Ministry of Health.

OBSERVATIONS

The Ambulance Services staff does not have accurate and/or consistent reference maps with which to logically evolve more efficient group-wide solutions to their dispatching problems. The difficulty of obtaining substantial and usable historical information is hindering the analysis and the decision making process.

The Air Ambulance Section has assumed the responsibility for the central air dispatch function as of July 1, 1983. This has added impetus to defining and implementing a feasible georeferencing system.

The possibility of a substantial increase in air ambulance coverage within Ontario is also probable. This could involve helicopter operations which would support more "initial patient pick-up" situations and the establishment of heliports at numerous hospitals. In such instances as apartment fires, major highway accidents and multiple injuries caused by natural disasters, the increased helicopter based activity will only exacerbate the georeferencing problems currently being experienced. It is also (and has been) a matter of life and death.

FUTURE WANTS AND NEEDS

Ambulance Services requires (at minimum) an accurate and usable planimetric map series to co-ordinate, dispatch and analyse its statutory responsibilities. The base maps will also require continuous updating to accurately reflect current infrastructure status.

G.I.S. POTENTIAL

The Ontario Base Maps (OBM) can serve as a sound base mapping series with which Ambulance Services might address its strategic, long term and daily operational commitments. The impact could be substantial. Ambulance Services could work with Ministry of Natural Resources to pilot test extensions to basic mapping, integrated tabular data bases and distributed processing techniques to directly aid their dispatching operation with graphic display and map projection systems.

DATA SOURCE INFORMATION SHEET

TITLE: MINISTRY OF HEALTH

SOURCE AGENCY: Emergency Health Services
PERSON: M. Bates
TITLE: Manager, Land Ambulance
ADDRESS: 7 Overlea Blvd.
7th Floor
Toronto, Ontario
M4H 1A8
PHONE: (416) 963-2640

DESCRIPTION: *Distance of land ambulances to pick up and transport patients as required.

*Financial Management

FORMAT:

	M	A	MEDIA
MAP	x		various
TABULAR	x		tape (OASIS)
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: all scales and types

ACCURACY/RESOLUTION: theoretically, ½ mile

SIZE/VOLUME: map sets for 600 ambulances and 200 dispatch/crew centres

GROWTH RATE: dispatch operation under review

DATA ITEMS: ambulance (land) crews work primarily from co-ordinating structure/streets in Metro to township/streets/co-ordinates in rural areas

RETRIEVAL KEY(S): 7-digit EHS key when using maps

GEOCODE: 7-digit code as follows: **

DATE OF CREATION: 1970 ±

FREQUENCY OF UPDATE: varies - Metro - continuous

COVERAGE/COMPLETENESS: entire province

SOURCE OF INFORMATION: ambulance call reports

USERS OF INFORMATION: land ambulance crews, dispatchers, EHS management, data input clerks, planners

VOLUME/FREQUENCY OF USE: 675,000 times/year plus territory drive-arounds, plus ambulance crew usage

ACCESS METHOD FOR USER:

AVAILABILITY: only to EHS staff

CHARGES: N/A

HARDWARE AND LOCATION: N/A

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

** 100 mile grid	xx-----
10 mile grid	--xx---
1 mile grid	----xx-
½ mile grid	------x

DATA SOURCE INFORMATION SHEET

TITLE: MINISTRY OF HEALTH

SOURCE AGENCY: Emergency Health Service
PERSON: H.E. Brown
TITLE: Manager, Air Ambulance
ADDRESS: 7 Overlea Blvd.
7th Floor
Toronto, Ontario
M4M 1A8
PHONE: (416) 963-2643

DESCRIPTION: Dispatching of helicopters and fixed wing aircraft to pick up medical patients for transport to base hospital facilities

FORMAT:

	M	A	MEDIA
MAP	x		various
TABULAR	x		tape (oasis)
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1:50 000 plus various types and scales

ACCURACY/RESOLUTION:

SIZE/VOLUME: 8,200 patients pick up/year

GROWTH RATE: Assume 5% annual growrh

DATA ITEMS:

RETRIEVAL KEY(S): A unique 7-digit number identifying a 100-10-1-½ mile schema

GEOCODE: 7 digits as defined by EHS.

DATE OF CREATION: 1970

FREQUENCY OF UPDATE: Pending

COVERAGE/COMPLETENESS: entire province

SOURCE OF INFORMATION: Ambulance call reports

USERS OF INFORMATION: Pilots, Air Dispatchers, Air Ambulance Management, Data Input Clerks, Planners

VOLUME/FREQUENCY OF USE: daily

ACCESS METHOD FOR USER: In-house use only

AVAILABILITY: Only useful to EHS staff

CHARGES: N/A

HARDWARE AND LOCATION: N/A

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: EMERGENCY HEALTH SERVICES

Ambulance Services Section

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA: GENERATION						CARTOGRAPHIC DATA: STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	General management	○	◐	◐	◐	○	◐	○	●							●
2	Dispatching	○	◐	◐	◐	○	◐								◐	●

AGENCY FUNCTIONS		CARTOGRAPHIC DATA: MANIPULATION / ANALYSIS: GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	General management	○		◐	◐	◐	◐	◐		◐	◐	◐	◐	●	
2	Dispatching	◐		●				◐			◐			◐	

AGENCY FUNCTIONS		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	General management	◐		◐											
2	Dispatching														

AGENCY FUNCTIONS		DISPLAY: COMPOSITION					DISPLAY: PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	General management	◐		◐	◐	◐	◐	◐			◐
2	Dispatching						◐	◐			

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	General management													
2	Dispatching													

8.3 EMERGENCY HEALTH SERVICES DIVISION AMBULANCE SERVICES BRANCH

METROPOLITAN TORONTO AMBULANCE SERVICE

ORGANIZATION AND RESPONSIBILITIES

The responsibility of the Metro Ambulance Service is to provide transportation and medical assistance for injured and convalescing patients to or from medical facilities in Metropolitan Toronto.

The Metro Ambulance Service is unique within the Ontario Emergency Health Service (EHS). Due to the population base within its area of responsiblity, it has needed to adopt relatively sophisticated dispatching techniques and activity analysis procedures to keep ambulance response time (and costs) to a minimum.

In addition, it operates within a complex funding and reporting environment. Metro government currently supplies approximatley 30% of its funding requirement, and the ambulance staff are employees of the Municipality of Metro Toronto. However, as the province pays the majority of its operating expense, and provincial statutes make EHS technically responsible for many of the services, Metro Ambulance, in effect, must report to both levels of government. In analysing its facilities and operations, this arrangement appears to operate successfully.

The administration, dispatch, communication and fleet garage operation is housed on Dufferin Street in northwest Metro. It is equipped with emergency power and has a computer room adjacent to dispatching operations.

In 1983, Metro Ambulance responded to 244,833 calls for assistance, which is approximately 36% of the provincial total. It supplies ambulance service within an 800 square mile area, the dimensions being roughly 40 miles east to west and 20 miles north to south. The ambulance fleet has approximately 100 ambulances on station plus 11 specially equipp i vans and buses for large scale emergency health requirements. The crews and equipment are located throughout Metro, so as to reduce ambulance response time. An extensive radio communications network is employed for control and co-ordination. In terms of size and call volume, Metro Ambulance is the third largest operation of its kind in the world. London and Moscow are first and second, respectively.

TASKS/SYSTEMS

1. Dispatch Ambulance Services

Metro Ambulance Service (MAS) has had to implement an enhanced form of dispatching due to the call volume. The following sequence describes the standard routine for handling an emergency situation within the Metro Ambulance Service facility.

a. Specially trained personnel receive calls for assistance via the "911" number, police radio and telephone networks, fire departments, etc. Six call-in positions are staffed at varying levels, depending on the time of day or certain circumstances (disaster support).

The principal elements of the discussion between the person calling and the MAS employee staffing the call-in position are:

- o The number of injured?
- o The extent of injury?
- o The location? This is usually defined in terms of street address, road intersection or building name, e.g., Stardust Motel.

b. While the caller is still on the phone, the MAS employee fills out a 3-part form (form # 2188-45) with time of call (to the minute), type of person who originated the call (10 categories), etc.

c. At the same time, the MAS employee attempts to verify if the address is indeed valid. Under stress, people may give a wrong street name or building definition. Pranksters also attempt to route ambulances to non-existent locations.

The locational process was originally supported by a reference book containing streets, valid addresses on the street (similar to the postal code cross-reference) and the Emergency Health Service (EHS) locational grid square that relates to that particular address or location. This locational process is now supported by a computer assisted dispatch (CAD) system, while the reference book plays a back-up role.

The EHS grid reference schema is composed of 100-10-1-1/4 mile grid squares which cover the entire province and are uniquely identified by a 7-digit/4-field key. The grid structure is as follows:

	Identifier
100 x 100 mile grid square	xx-----
10 x 10 mile grid within the above 100 x 100 mile grid	--xx---
1 x 1 mile grid within the above 10 x 10 mile grid	----xx-
1/4 x 1/4 mile grid within the above 1 x 1 mile grid	------x

As the grids arbitrarily bisect townships, streets, buildings, etc., the cross-reference index is arranged as follows:

Example: Municipality "X"

Maple Street	Grid Reference
50-152	10 14 27 3
153-485	10 14 28 2
486-902	10 15 77 4

The grid reference is recorded at the call-in station and serves as the all important locational parameter which will follow each emergency call throughout the transaction cycle. The map indexes and street maps are physically sequenced and referenced to the 7-digit grid number. For instance, the maps book kept in each ambulance is sorted by ascending grid numbers, e.g.:

grid 1418231 is page X
grid 1418232 is page X + 1, etc.

The wall maps, which are shown in various scales in the dispatch centre, also are defined exclusively by the EHS grid schema.

d. The ambulance dispatch record is then separated, with one copy remaining with the call-in section and two copies being placed on a conveyor belt which forwards the form (# 2188-45) to one of four dispatch control desks. Metro has divided their 800 square mile area of responsibility into four nearly equal units. Each metro quarter section has a dedicated dispatch desk that works primarily within that one section. Depending on the grid reference number of the emergency call, one of the four dispatchers will assume responsibility. It is planned to eventually have the CAD system handle the call-in/dispatch desk data interchange.

The ambulance dispatcher must assess a number of different parameters including which ambulance or group of ambulances are closest to the accident, and which hospital the patient will be taken to, etc. The dispatcher, not the ambulance driver, is the final authority.

e. While the ambulance is en route to the accident location and then to the hospital, the dispatcher is in constant contact with the ambulance crew and records various time factors (arrive scene, departed scene, etc.). They also record the hospital location in terms of a 7-digit locational code.

f. The dispatch information is later loaded into the metro computer system where records are kept and a strip tape is generated for input into the provincial OASIS system.

The metro computer system currently has two PDP 11/34s with discs, tapes and printers. The system will soon be upgraded to two PDP 11/44s.

2. Perform General Management

On completion of the ambulance call, the crews are required to complete an extensive call report (18 information categories), processed directly by the OASIS system. Other general management functions and report generation are carried out as well.

OBSERVATIONS

Metro Ambulance is very progressive. In talking with them generally about digital mapping, it was evident they would like a closer look and to possibly participate in a test. They are already considering the addition of a "war room" type dispatch environment that is computer supported.

In relation to mapping, new georeferencing methodologies and digital mapping, it appears they are waiting to see what the Ministry of Health's position will be before undertaking any project.

The Metro Ambulance Service, unlike other EHS ambulance services, use the EHS 7-digit location code for dispatching purposes as well as statistical purposes. Other ambulance services use the 7-digit location code for after-the-fact statistical purposes only.

FUTURE NEEDS AND WANTS

The Ambulance Service desires to complete and implement the Computer Assisted Dispatch System.

The Service also desires accurate maps that can be updated as soon as a new subdivision is inhabited. Furthermore, a system to provide co-ordinates of ambulance positions in real time would be most useful for ongoing tasks of the Ambulance Service.

G.I.S. POTENTIAL

The operating environment of Metro Dispatch would be very conducive to a digital mapping pilot test. Additionally, Metro has a full time mapping draftsman who could add an interesting perspective to a pilot project involving EHS.

The management task would benefit from the availability of an array of G.I.S. capabilities. These would include: polygon overlay, polygon dissolve, point in polygon, transformations, buffering, windowing, proximal analysis, line length calculation, area perimeter calculation, distance accommodation, optimal path selection and time/distance districting, as well as various cartographic display functions.

Dispatching activities would also make use of various techniques for storage, geometric analysis, and display of cartographic data.

DATA SOURCE INFORMATION SHEET

TITLE: MINISTRY OF HEALTH

SOURCE AGENCY: Metro Toronto Ambulance Service

PERSON: Larry Bull & Ken Kitchen

TITLE:

ADDRESS: 4330 Dufferin Street
Downsview, Ontario
M3H 5R9

PHONE: (416) 636-6810

DESCRIPTION: dispatching of land ambulances

FORMAT:

	M	A	MEDIA
MAP	x		paper, microfiche
TABULAR		x	disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: varied

ACCURACY/RESOLUTION: varied

SIZE/VOLUME: not available

GROWTH RATE: 200,000 - 250,000 records/year

DATA ITEMS: OASIS grid system code address

RETRIEVAL KEY(S): OASIS - 7-digit grid system code

GEOCODE: OASIS - 7-digit grid system code

DATE OF CREATION: 1970

FREQUENCY OF UPDATE: continuous

COVERAGE/COMPLETENESS: Metro Toronto and immediate surroundings (approx. 800 sq. miles)

SOURCE OF INFORMATION: ambulance dispatch forms filled at call-receive time

USERS OF INFORMATION: land ambulance crews management and ambulance station planners

VOLUME/FREQUENCY OF USE: 225,000 transactions/year

ACCESS METHOD FOR USER: in-house use

AVAILABILITY: in-house use

CHARGES: NIL

HARDWARE AND LOCATION: 2 PDP 11/44 at
4330 Dufferin St.

SOFTWARE: PRIOR LTD. - computer aided dispatch software

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: MINISTRY OF HEALTH

Metro Toronto Ambulance
Service

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
◉ AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

			TABULAR DATA							
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
AGENCY FUNCTIONS	1	General Management	○	●	●	●	○	●	○	●
	2	Dispatching	○	●	●	●	○	●		

			CARTOGRAPHIC DATA																				
			GENERATION						STORAGE	MANIPULATION / ANALYSIS													
										GEOMETRIC ANALYSIS													
			COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
AGENCY FUNCTIONS	1	General Management							●	○		◉	◉	●	●	◉		◉	◉	●	●	◉	
	2	Dispatching						◉	●	◉		◉				◉			◉			◉	

			CARTOGRAPHIC DATA													
			MANIPULATION / ANALYSIS													
			NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
			OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
AGENCY FUNCTIONS	1	General Management	◉		◉											
	2	Dispatching														

			CARTOGRAPHIC DATA									
			DISPLAY									
			COMPOSITION					PRESENTATION				
			QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
AGENCY FUNCTIONS	1	General Management	◉		●	●	◉	◉	◉			◉
	2	Dispatching						◉	◉			

			IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
			COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	General Management													
	2	Dispatching													

8.4 INFORMATION SYSTEMS DIVISION

8.4.1 MANAGEMENT SYSTEMS BRANCH HEALTH SYSTEMS SUPPORT SECTION

ORGANIZATION AND RESPONSIBILITIES

The Health Systems Support Group is responsible for providing maintenace support for all health computer systems. The Health Systems Support Group for the Ministry of Health is divided into two segments: one segment is now in Kingston to support OHIP and other health insurance related functions, and the second has remained in Toronto and supports other ministry functions such as Community Health, OASIS, hospital facilities analysis, District Health Council requirements, and so forth.

Each systems group has the standard separation of system development from systems maintenance and enhancements. The Toronto segment of the Health Systems Support Group is responsible for the maintenance of 87 programs that support the Toronto user operation. The current staffing level for this department is 24.

There are a number of interrelated client-organizations that use the 87 programs for retrieval and analysis of operational and financial data, policy and long-range planning, audit, and other functions. The organizations which directly utilize the systems are: the Information Facilities Group, the Information Retrieval Group, and the Data Development and Evaluation (DDE) Unit. This last group is of particular interest as it uses a series of progams with a distinctive geocoding schema relative to "residences".

TASKS/SYSTEMS

1. Maintain OASIS System

The Health Systems Support Group (in Toronto), performs numerous maintenance activities. These include systems acceptance (from the development group of outside contractors), table updates, program modifications that remedy defined problems, implementation of required enhancements, and management of the knowledge/training base for ongoing operations.

IMS is the data base management system used in many of the programs. The programs and their data bases run on provincial data centre facilities. Six of the 87 programs use the DDE geocode. The geocode is structured as follows:

- Counties within Ontario are sorted in alphabetical sequence and assigned a 2-digit code in the high order positions of the key.

- Cities, towns, villages, townships and Indian reservations are sorted alphabetically within counties and all entities are then numbered sequentially.

Example:	02--	(Bruce County)
	--08	(Lions Head)
	0208	Composite

OBSERVATIONS

The 4-digit geocode as shown above has no correlation to the 7-digit georeferencing code that is used by the Air and Land Ambulance groups within the Ministry of Health.

FUTURE NEEDS AND WANTS

The Health Systems Support Group is basically a support organization. As such, it has no specified user requirements.

G.I.S. POTENTIAL

The District Health Councils, which are becoming increasingly responsible for determining health care coverage in Ontario, are primarily aligned along county boundaries. This coincides with the DDE composite definition.

It is recommended that the pilot project allocate an overlay level in the digital mapping pilot along county/township boundaries and another level along the land ambulance regional/district boundaries. This could serve as a basis to demonstrate statistical capabilities associated with county and/or ambulance region geographical entities.

9 MINISTRY OF MUNICIPAL AFFAIRS AND HOUSING

9.1 OVERVIEW

The Ministry has responsibilities for local government, community planning, provincial land holdings and housing. It makes sure municipalities have the legislative authority to respond to local needs and offers management and administrative support, along with financial assistance, to municipalities. It encourages sound planning at the community level and helps meet the housing needs of residents, particularly, low and moderate income families, senior citizens and the disabled.

To carry out this mandate, a number of divisions have been created. The programs relevant to this study include the Community Planning Programs Division and the Municipal Operations Division.

The purpose of Community Planning Programs is to provide operational and technical assistance to encourage effective community planning and renewal activity in municipalities.

The purpose of the Municipal Operations Division is to provide:

a) the financial management and reporting requirements for municipalities;
b) a full range of advisory services to improve local government effectiveness;
c) publication of extensive management improvement research;
d) promotion of operation of local government through a network of field offices; and
e) assistance to municipalities in the resolution of boundary disputes.

9.2 PLANS ADMINISTRATION DIVISION COMMUNITY PLANNING REVIEW BRANCH

ORGANIZATION AND RESPONSIBILITIES

The Plans Administration Division is responsible for providing operational and technical assistance to encourage effective community planning and renewal activity in municipalities. The technical assistance is carried out by the Community Planning Review Branch. The Branch has a staff of 120 people, including 40 planners and 10 mapping drafts persons.

TASKS/SYSTEMS

The Community Planning Review Branch carries out numerous tasks, as described below.

1. Process and Recommend for Approval Official Plans of Municipalities and Plan Amendments

Currently, 650 of the 837 municipalities have approved Official Plans. The Community Planning Review Branch assists municipalities in planning and documenting their subdivision. There are in excess of 10,000 amendments to Official Plans on record.

The Branch relies on two major sources of land-related information to carry out this task. The first data source is the maps created and maintained by in-house staff at head office. These maps are quite old and, in some cases, at a scale of one inch to one mile. The maps outline a geographic area and indicate, for example, a granted subdivision permit. The administrative staff marks this geographic area with a prefix code indicating the status (approved/disapproved) and attach it to a sequentially assigned number which serves as a cross-reference to the file folder containing the complete proceedings. White prints of these maps are made on request.

2. Approve Plans of Subdivision and Condominiums

The Branch approves plans of subdivisions and condominiums for municipalities, except in those cases when regional municipalities have approval power.

3. Approve Amendments to Municipal Land Use Plans

The Branch administers minister's zoning orders, part-lot control, validation of title to lands subdivided in contravention of the Planning Act, and road adjustment applications. It provides comments to the Ontario Municipal Board on municipal zoning bylaws. It also monitors land severance approvals delegated to planning boards, committees of adjustment and land division committees. It administers land severance applications, where not delegated, in Northern Ontario.

4. Clear Cloudy Titles

The Branch processes Niagara Escarpment Development Control Appeals.

The Branch also administers activities concerning the parkway belt system, including the processing of amendments to the parkway belt land use regulations. The lands surrounding parkways and other greenbelt areas and which traverse townships and jurisdictions must be owned by a duly authorized government agency. In the case of Ontario, the agency is the Community Planning Review Branch. Thus, the Branch's responsibilities include expropriation and ownership.

To effectively carry out all of the above tasks a new information system is being implemented. This is basically an administration and transaction control system for the Branch. The system is running at the Data Crown Computer Centre and uses the M204 data base management system. At present, there are 30,000 records in the data base and the input/output is supported by 11 soft copy terminals, one for each of the 11 planning groups in the Branch.

The major system transactions and the associated georeferencing elements are defined as follows:

- Subdivision/Condominium
  - area, municipality (federal definition)
  - geographic township, lot, concession
  - map reference and grid numbers
- Zoning Order, one of
  - area, municipality
  - geographic township, lot, concession
  - map reference and grid numbers
- Road Adjustment, Validation Order, one of
  - area, municipality
  - geographic township, lot, concession
- Parkway Belt, one of
  - area, municipality
  - geographic township, lot, concession

The system also keeps track of the "status" of all transactions within the system, including: Official Plans; Subdivision/Condominiums; Zoning Bylaws; Zoning orders; Minister's consent; Road Adjustments; Part-Lot Control; Validation Orders; Niagara Escarpment Commission Appeals; Parkway Belt; and Minister's Letters.

OBSERVATIONS

The process of land-related data gathering and analysis is relatively difficult, time-consuming and costly. Provided that MNR can supply digitized

OBM maps (and support technology in conjunction with digitized parcel maps), the Branch's operation could be significantly enhanced with little incremental funding or effort.

A booklet, titled "The Use of Computers in Planning - An Overview of the Ontario Situation" was published in March, 1983. It indicates that 18 municipalities are using some form of automation in planning with 31 programs and packages being used. The software categories are isolated as follows:

- Community Analysis and Planning
- Forecasting
- Geographic Data Analysis/Geographic Information Systems
- Land Use and Land Resources Planning
- Statistical Analysis and Data Manipulation
- Transaction Planning

Fourteen of these packages were produced by consultants, six were prepared in-house, seven by the province, one by the University of Toronto and three by an unknown source.

None of the municipalities indicated they had any packages for the following functions:

- Census Data Manipulation
- Environmental Impact Assessment
- Fiscal Impact Assessment
- Mapping and Graphics

FUTURE NEEDS AND WANTS

In the long term, the Branch has a number of needs regarding land-related information capabilities for more effective operations. The Branch desires current base maps with common scales and contents to replace the antiquated base maps that are currently used, of varying projections, scales, etc. An enhanced capability to update and maintain land-related data in map form as well as enhanced capability to couple the map data with associated tabular data are desired to augment their current capabilities.

The Branch would like to augment its current data base and retrieval options with owner/past ownership data by property, and history of plans and decisions relative to parcels or group of parcels.

The Branch would also like to take advantage of georeferencing techniques and methodologies to resolve the locational problems associated with planning activities.

G.I.S. POTENTIAL

The MNR pilot project could very easily demonstrate that accurate and up-to-date base maps (with parcel boundaries overlaid), can serve as an optimum foundation for an integrated land information support system. In turn, this system could supply the Community Planning Review Branch (and many other ministries) with the ability to definitely upgrade services while maintaining (or reducing) present operating costs.

DATA SOURCE INFORMATION SHEET

TITLE: COMMUNITY PLANNING REVIEW

SOURCE AGENCY: Ministry of Municipal Affairs & Housing
PERSON: Satish Dhar
TITLE: Senior Planner
ADDRESS: 56 Wellesley Street West
Toronto, Ontario

PHONE: (416) 585-6072

DESCRIPTION: Regulatory agency for land use (planning and Policy) in Ontario

FORMAT:

	M	A	MEDIA
MAP	x		chronoflex
TABULAR	x	x	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: varied

ACCURACY/RESOLUTION: varied

SIZE/VOLUME:

GROWTH RATE:

DATA ITEMS:

RETRIEVAL KEY(S):
- municipality name
- type of plan

GEOCODE: township/municipality

DATE OF CREATION:

FREQUENCY OF UPDATE: on-going

COVERAGE/COMPLETENESS: Province-wide

SOURCE OF INFORMATION: municipal planning agencies

USERS OF INFORMATION: community planners in the Ministry

VOLUME/FREQUENCY OF USE: frequent in-house use

ACCESS METHOD FOR USER: in-house

AVAILABILITY: available to in-house community planners

CHARGES: nil

HARDWARE AND LOCATION: new administration system being installed using Data Crowns IBM hardware

SOFTWARE: model 204 DBMS

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: MINISTRY OF MUNICIPAL AFFAIRS AND HOUSING

Community Planning Review

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

	AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Approve Municipal Land Use Plans					○	○		○	○						◐
2	Approve Ammendments to Land Use Plans															
3	Inter-Ministry Projects - Flood Plains					○	○		○	○						◐
4	Clear Cloudy Titles	○	○				○		○							

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Approve Municipal Land Use Plans	◐		◐			◐	◐			○	○			
2	Approve Ammendments to Land Use Plans	◐		◐			◐	◐							
3	Inter-Ministry Projects - Flood Plains	◐		◐			◐	◐							
4	Clear Cloudy Titles														

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Approve Municipal Land Use Plans														
2	Approve Ammendments to Land Use Plans														
3	Inter-Ministry Projects - Flood Plains														
4	Clear Cloudy Titles														

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Approve Municipal Land Use Plans			◐	◐	◐	◐				◐
2	Approve Ammendments to Land Use Plans			◐	◐	◐					
3	Inter-Ministry Projects - Flood Plains			◐	◐	◐					
4	Clear Cloudy Titles										

	AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Approve Municipal Land Use Plans													
2	Approve Ammendments to Land Use Plans													
3	Inter-Ministry Projects - Flood Plains													
4	Clear Cloudy Titles													

9.3 MUNICIPAL OPERATIONS DIVISION
MUNICIPAL MANAGEMENT POLICY BRANCH
FINANCIAL INFORMATION SECTION

ORGANIZATION AND RESPONSIBILITIES

The Financial Information Section administers the Municipal Analysis and Retrieval System (MARS). MARS is a data base management system containing demographic, financial, service and program related information about the Province of Ontario and its municipalities. MARS aids in the decision making process of the provincial and municipal governments by applying:

1. policy information to the Provincial Legislature;
2. key statistics to manage policy options, unconditional grants and analyse the impact of municipal boundary changes; and
3. information that assists municipalities in formulating sound fiscal management policies.

The Municipal Management Policy Branch makes MARS available to ministries, municipalities, private organizations and research agencies in Ontario and across Canada. The responsibilities of the Financial Information Section of the Branch are:

1. To administer MARS, i.e., to ensure that the data that is maintained in the data base is correct and to this end carry out integrity checks on the data.

2. To produce reports in response to inquiries from public and private organizations in regard to municipal financial data. Approximately 400 reports are produced in a year in response to these inquiries.

3. To provide advice to interested parties relating to use of the MARS system to obtain information.

The responsibilities of this Section are carried out by a staff of 10 which include seven professionals and three clerical personnel.

TASKS/SYSTEMS

Administering the Municipal Analysis and Retrieval System (MARS)

MARS is an integrated data base management system with sophisticated retrieval and report writing tools. The municipal financial information that is input to this system by this Section is received on special summary forms on which the municipalities have put data from their financial statements. Other municipal data such as the assessment data, is also input to MARS. This assessment information is received directly from the Ministry of Municipal Affairs and Housing for the 838 municipalities. In addition to this data received from the municipalities, this Section also sees to it that certain information from a number of School Board districts are also maintained on the system. In all, there are approximately 2,300 data elements maintained in the MARS system which can be accessed for the interested organizations to produce evaluation and analysis reports. Some of the reports currently produced by the MARS data base are:

1. Financial Indicators Reports,
2. Financial Evaluations,
3. Resource Equalization Grant Policy Development,
4. Local Sector Performance Review,
5. Unconditional Grant Policy Development and Administration,
6. Apportionment Policy Development and Administration, and
7. Boundary Change Impact.

In addition to the municipal and education district data, other data maintained on the system include municipal election information and population projection data. In regard to municipalities, seven years of financial data is maintained on the system. This includes five years of historical data as well as that data which is available for the present year and projected or budgeted financial data for the upcoming year.

For the most part, the information within the system is on an aggregated basis, i.e., at the municipal level. Hence, the main retrieval key for this information is the municipal code. One application of MARS that requires the use of smaller data units than the whole municipality, involves the boundary change impact studies. In essence, this involves determining the financial impact on the municipality if a boundary change were to occur. To carry out this analysis, the assessment records for the municipality are accessed through MARS and the revenue data that can be expected from individual parcels bordering municipal boundaries can be manipulated to see the loss or gain of revenue to the municipalities from the change in boundaries. MARS has also been utilized to analyse the effects of particular developments, such as shopping malls, on the general revenues of municipalities.

This Section utilizes a distributed data processing concept to administer MARS. For data entry purposes 90% of this is carried out by outside contractors, however, for accessing and manipulating the data the Section staff uses six IBM personal computers and a DEC PDP/11 minicomputer which are linked to a Univax 80 computer. This configuration allows the Section to access and manipulate the data and generate any necessary reports.

OBSERVATIONS

MARS is used extensively for policy analysis work by a variety of organizations which include three branches within the Treasury Department and other branches in the government, as well as individual municipalities, private organizations and universities. Approximately 400 reports are produced per year to meet the information needs of these organizations. The task of producing these specialized reports takes a considerable amount of staff time. In addition to these special requests for MARS reports, there are also other reports available. These are the annual reports of MARS data as well as computer printout reports which provide a summary of municipalities statistics.

FUTURE NEEDS AND WANTS

As previously mentioned, most of the data within MARS is used for policy analysis and hence the availability of accurate maps are not essential. However, due to the large number of municipalities in question and the equally large number of data element within MARS, it is felt that the availability of a digital map showing the municipal boundary outlines on which thematic information can be overlaid would be useful for policy analysis.

G.I.S. POTENTIAL

The information contained within MARS is aggregated to the municipal level, rather than maintained at the parcel level. For this reason parcel maps within the individual municipalities would not be beneficial to the operations of this Section. It is felt, though, that the availability of a digital map outlining the municipal boundaries would be of use in policy analysis by the government and outside organizations. An accurate digital map would not be required, rather the ability to overlay thematic information on these maps would be of great help in policy analysis. The availability of a digital map would be useful for basically two reasons, the first being the large amount of data that has to be dealt with, and secondly, in many instances the data is required quickly for meetings and special reports.

DATA SOURCE INFORMATION SHEET

TITLE: MUNICIPAL ANALYSIS AND
RETRIEVAL SYSTEM (MARS)

SOURCE AGENCY Municipal Affairs & Housing
PERSON: Jim Stark
TITLE: Senior Project Leader
ADDRESS: M.A.H. 3rd floor,
Mowat Block, Queen's Pk.
Toronto M7A 1C2

PHONE: (416)965-2265

DESCRIPTION:
A DBMS containing municipal finance and demographic data

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	disk
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:
data aggregated for municipalities

SIZE/VOLUME:
838 municipalities several school boards
approx. 2300 data elements for 7 years

GROWTH RATE:
marginal

DATA ITEMS:
municipal financial data
- demographic data
- municipal election districts
- assessment data (used for municipal boundary change analysis)

RETRIEVAL KEY(S): municipal code

GEOCODE:
none

DATE OF CREATION: data maintained on system from 1977

FREQUENCY OF UPDATE:
yearly

COVERAGE/COMPLETENESS:
838 municipalities in Ontario

SOURCE OF INFORMATION:
- municipalities
- school boards

USERS OF INFORMATION:
Ministry of Municipal Affairs & Housing
" " Revenue
" " Education
Treasury
- municipalities
- universities
- private firms

VOLUME/FREQUENCY OF USE:
daily
approx. 400 special reports produced per year

ACCESS METHOD FOR USER:
reports

AVAILABILITY: open

CHARGES: cost recovery to private sector and universities

HARDWARE AND LOCATION: 6 IBM PC's and DEC PDP11 linked to UNIVAC 11/80, belonging to Computer Systems Can. Ltd., Toronto

SOFTWARE:
DBMS - MANAGE
statistics and report generator pkgs. as well as business graphics

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
- no data dictionary
- on line access or batch processing

The system is linked to the CSC worldwide network - CODASYC

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:
Municipal Analysis and
Retrieval System (MARS)
Ministry of Municipal
Affairs and Housing

LEGEND:
- ○ MANUAL PROCESS
- ● NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

		TABULAR DATA								CARTOGRAPHIC DATA																																													IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
										GENERATION						STORAGE	MANIPULATION / ANALYSIS																													DISPLAY																					
																	GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
AGENCY FUNCTIONS		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	CODO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Administering MARS	○	●	●	●	●	●	●	●								☐			☐																							☐	☐	☐	☐	☐	☐	☐	☐				☐								●	●				

10 MINISTRY OF NATURAL RESOURCES

10.1 OVERVIEW

The Ministry of Natural Resources is responsible for administering, protecting and conserving public lands and waters. The Ministry is also responsible for providing opportunities for outdoor recreation and resource development for the benefit of the people of Ontario. Specific programs for land, water, trees, fish, wildlife and mineral resources are developed and administered by this Ministry.

The Ministry of Natural Resources is structured into five groups: the Finance Planning and Evaluation Group, the Forest Resources Group, the Lands and Waters Group, the Outdoor Recreation Group and the Minerals Group. Relevant organizations within the four latter groups were interviewed regarding their land-related responsibilities.

10.2 FOREST RESOURCES GROUP

The Forest Resources Group is responsible for the management of timber harvest and production in Ontario. The Group is also responsible for providing woodland for the recreational purposes of the general public. In carrying out its mandate, the Forest Resources Group administers the following Acts:

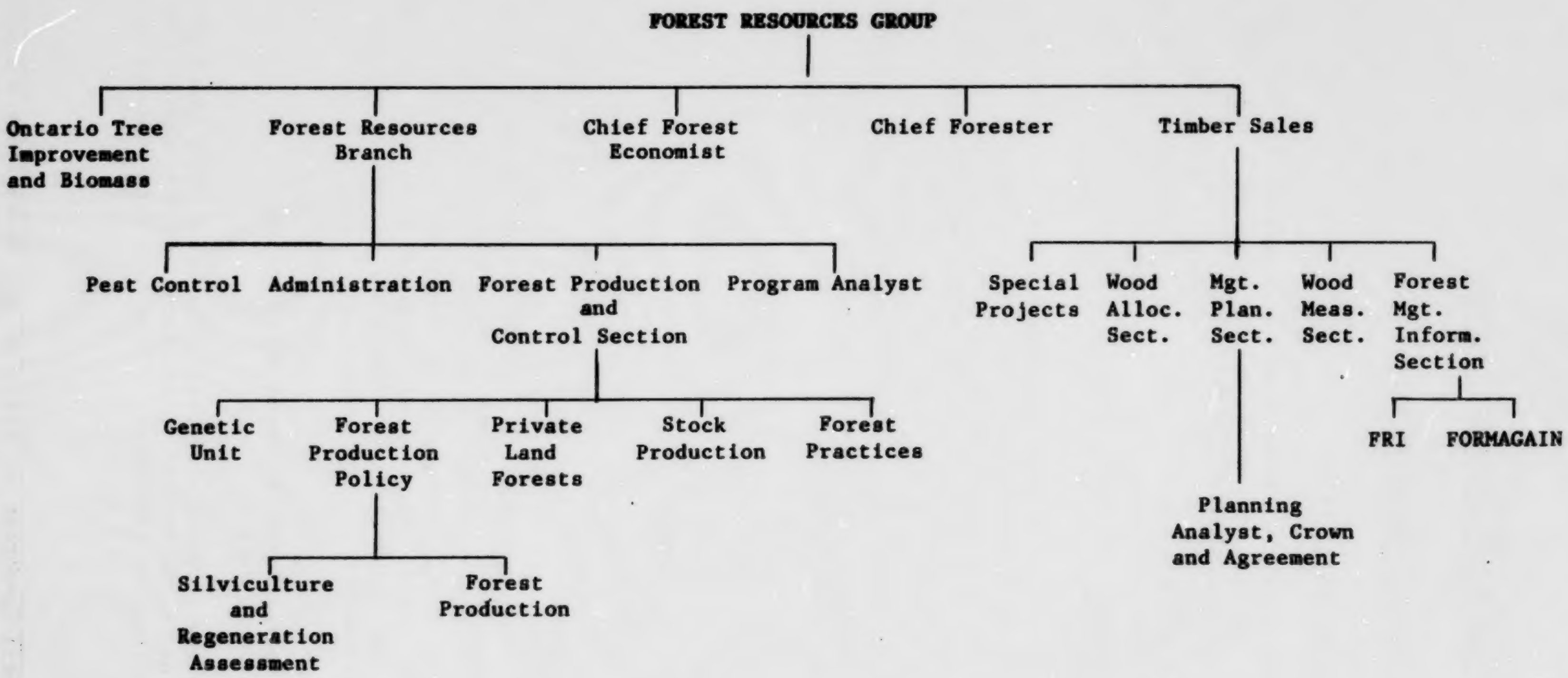
CROWN TIMBER ACT	- granting of timber licences for Crown lands - administering Forest Management Agreements (FMAs) and Crown Management Units (CMUs) with private industry
Forestry Act	- advising private landowners on forest management - operating provincial nurseries
Settler's Pulpwood Protection Act	- regulating the sale of pulpwood from settler's land
Spruce Pulpwood Exportation Act	- administering exportation of spruce pulpwood under certain conditions
Trees Act	- allowing municipalities to enact bylaws restricting tree destruction
Woodlands Improvement Act	- permitting the Ministry to enter into agreement with owners for skid improvement or planting of nursery stock
Woodmen's Employment Act	
Woodmen's Lien for Wages Act	
Forest Tree and Pest Control Act	

To facilitate this mandate, five branches have been formed, as shown in Figure 10.2-A. The branches relevant to the User Needs Study are the Forest Resources Branch and the Timber Sale Branch.

The Forest Resources Branch is responsible for research and forest production practices and to ensure completion of reforestation projects. Of the four sections in this Branch, the Forest Production and Control Section is most relevant to the User Needs Study. The Silviculture and Regeneration Assessment Unit within this Section is responsible for ensuring the growth of trees in new production after logging on a site has been completed.

The major responsibility of the Timber Sales Branch is to allocate and monitor timber resources of both private and public lands. In carrying out this responsibility, the Branch maintains a forest resources inventory (FRI Unit) and allocate allowable cuts to forestry companies holding forest licences for Crown lands. In co-operation with private landowners, the Branch offers advice on forest production and reforestation services.

Figure 10.2-A


FOREST RESOURCES GROUP
Ontario Tree Improvement and Biomass
Forest Resources Branch
Chief Forest Economist
Chief Forester
Timber Sales
Pest Control
Administration
Forest Production and Control Section
Program Analyst
Genetic Unit
Forest Production Policy
Private Land Forests
Stock Production
Forest Practices
Silviculture and Regeneration Assessment
Forest Production
Special Projects
Wood Alloc. Sect.
Mgt. Plan. Sect.
Wood Meas. Sect.
Forest Mgt. Inform. Section
Planning Analyst, Crown and Agreement
FRI
FORMAGAIN

10.2.1 TIMBER SALES BRANCH FOREST MANAGEMENT INFORMATION SECTION

10.2.1.1 FOREST RESOURCE INVENTORY UNIT

ORGANIZATION AND RESPONSIBILITIES

The purpose of the Forest Resource Inventory (FRI) Unit is to provide an inventory of forest resources in the province. The inventory provides quantitative information about major tree species and attributes of forest stands including dimensions and age. This inventory is produced in the form of maps, aerial photographs and reports, and is the basis for forest resource management decisions. Inventory data is used in the preparation of the management plan, and indicates quantities of wood to be harvested annually, location of the cut, and how the Unit is to be developed.

The FRI Unit is also responsible for maintaining an up-to-date library of aerial photographs covering the entire province, with the exception of Hudson's Bay Lowlands and the most northern part of the province. Products made from these negatives are sold to the public and other government agencies through the Public Service Centre.

The FRI Unit has a staff of 35, of which 10 persons are involved in drafting. The remainder are involved in compilation, photography, photo interpretation and administration.

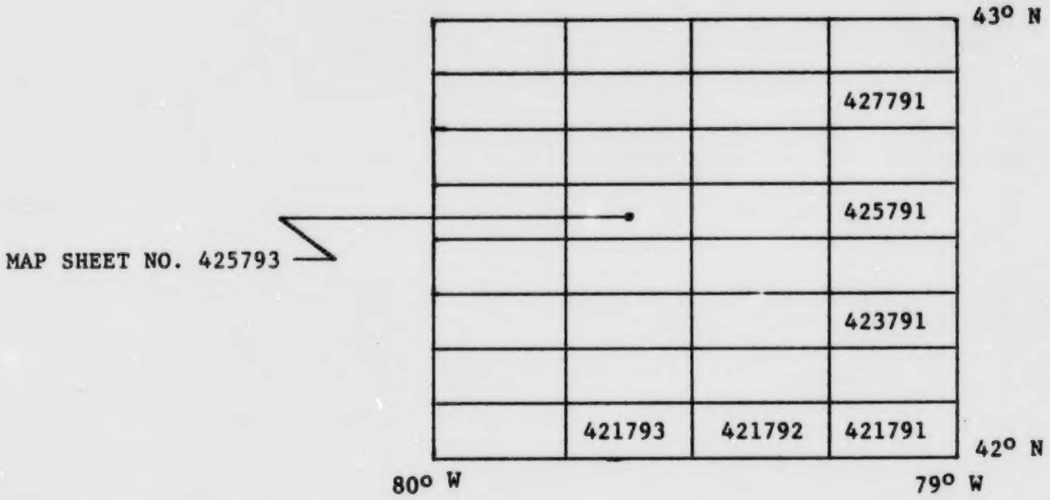
TASKS/SYSTEMS

1. Acquire Aerial Photography

For the purposes of efficient forest management, the province has been divided into approximately 110 management units. The inventory is on a 20-year cycle, in which half the province is covered each year. This process begins with the acquisition of aerial photography. Every year, aerial photography covering approximately 15,000 to 18,000 square miles is carried out, under contract, by private companies at a scale of 1:15 840 for Northern Ontario and 1:10 000 for Southern Ontario. The first complete coverage of aerial photography of the province was obtained over an 11-year period from 1946 to 1957. Since then, two additional complete sets have been obtained (from 1958-1968 and 1969-1976). Currently, annual photography is being obtained for a fourth set.

2. Produce and Revise Forest Resource Base Maps and Build Tabular Data Base

During the original inventory cycle (1946-1958) planimetric base maps were produced on a poly-conic projection and were numbered uniquely using longitude and latitude as references. These maps were produced on a linen base and measured 7-1/2 minutes in latitude and 15 minutes in longitude. Thus, a degree square covered 32 maps as shown below:



These maps were numbered by starting with the latitude (e.g., 42) followed by the map number from 1 to 8. Thus, 422 is the second map north of the 42° parallel of latitude.

During the second re-inventory period, the format of the FRI maps was changed to a geographic township base. Township base maps for all surveyed townships were reproduced from the original base map.

Currently, the FRI Unit maintains a total of 5,500 planimetric maps which are a combination of geographic township format and the original base map format. A duplicate set of these planimetric base maps showing forest stands is also maintained. Where a township base map exists, the township is the basic unit of geographic identification. The FRI Unit plans to use Ontario Basic Maps when sufficient coverage in township format is available.

Since the base mapping is complete, the current 20-year inventory cycle involves updating or revising existing maps, except where extensive disturbances have occurred. Each year after the aerial photography is flown, three copies of photographs are prepared. One copy is sent to the Drafting Group of the FRI Unit for revision of all planimetric and cultural features on the base map. The Drafting Group also updates ownership information. The second copy is used as the basic input in the preparation of forest inventory data. The third copy is given to the Photo Library to keep its collection up-to-date.

On longer licensed holdings, the licensee enters into a co-operate agreement with the Crown to undertake a forest inventory using MNR standards. Under the terms, the company is responsible for field work to obtain species, composition, age, height, stocking and site class data. Data for the rest of the forest stands, because all are not visited in the given management unit, are gathered by means of photo interpretation. This interpretation is also undertaken by the company, using the field checks as a guide. All of the above information is depicted on the aerial photographs (see the **Appendix**). The typed photographs are then sent to the Compilation Group of the FRI Unit which is responsible for compilation and forest stand drafting.

3. Compile Maps and Tabular Data

The Compilation Group performs the following steps to compile forest maps and tabular data:

a. receive an updated working base map from the Drafting Group;
b. delineate basic areas, i.e.:

- water
- nonforested land
- forested land
  - productive forested land
  - nonproductive forested land

c. transfer inventory data from typed photographs to map;
d. number forest stands;
e. perform area calculations by dot matrix (manual) method; (see Figure 10.2.1.1-A);
f. fill standard coding forms for input to computer program updating inventory data base and for reporting purposes. The coding forms are then supplied to the Systems Branch of MNR for keypunching and execution of the computer program. All data items to be coded are shown in the coding form contained in the **Appendix**.

The data base program is indexed-file software which was developed in-house. This original software with a number of patch-up enhancements runs on the IBM mainframe at the Queen's Park Computer Centre. The primary function of the software is to update inventory data base, perform edits on input data and to generate various types of reports. The retrieval keys are township or base map, forest district, management unit, stand number and ownership.

Reports and the updated working base maps are then passed on to the Drafting Group, which updates the original base map showing forest stands. The Drafting Section also produces a composite map of a complete management unit. This is done by photographing individual base maps, splicing together all negatives and preparing a reproposítive copy. Preparation of this composite map showing the entire management unit and detailed forestry information is the final step of the inventory cycle and is intended to be used for planning purposes, such as allocating the stands scheduled for harvesting.

Ministry of Natural Resources
Ontario

Area Record Sheet

Scale: 1 dot = ____ hectares

Management Unit		Township or Base Map Number	
Entered by	Checked by	Date	Page of

W/C																	Total Hectares
Own Area	Crown				Patent												
Type No.	Dots	ha	Dots	ha	Dots	ha	Dots	ha	Dots	ha	Dots	ha	Dots	ha	Dots	ha	
Totals																	

Ownership	Crown	Patent					Totals
W/C #							
W/C #							
W/C #							
Totals							

836 (2/78)

Figure 10.2.1.1-A

TS 400

The products produced by the FRI Unit are:

1. Aerial Photographs as well as enlargements, copy negatives, diapositives, etc. - sold to the public through MNR's Map Office.
2. Planimetric Maps (without forest stands) - sold to the public through MNR's Map Office.
3. Forest Resource Inventory Maps - sold to the public through MNR's Map office.
4. Computer Reports - which are ledgers containing detailed forest stand data and summaries of areas and volumes by working group, age classes, site classes for each map sheet and totals for the management unit.

For a diagram of the Workflow see Fugure 10.2.1.1-B.

OBSERVATIONS

A major problem for the FRI Unit is the length of time which elapses between taking of aerial photography and production of a composite map. This totally manual process takes approximately two to three years. Efforts to speed up this process using modern technology (e.g., FORMAGAIN) are under way. The inventory cycle is normally completed once every 20 years.

The inventory data base is maintained by the Systems Services Branch of MNR. The Systems Services Branch should be visited for further technical details of the data base and associated software.

FUTURE NEEDS AND WANTS

The FRI Unit would like several additional capabilities incorporated into existing operations. These include:

a. the ability to automate drafting for consistency and improved production;
b. streamlined compilation procedures (which are currently being implemented);
c. the ability to communicate with the inventory data base in real time for inquiries, ad hoc reports, and other uses;
d. automated retrieval of ownership information from the Titles Section;
e. the use of OBM maps when desired scales and formats are different from that required; and
f. the use of generic software functions such as point in polygon and polygon overlay.

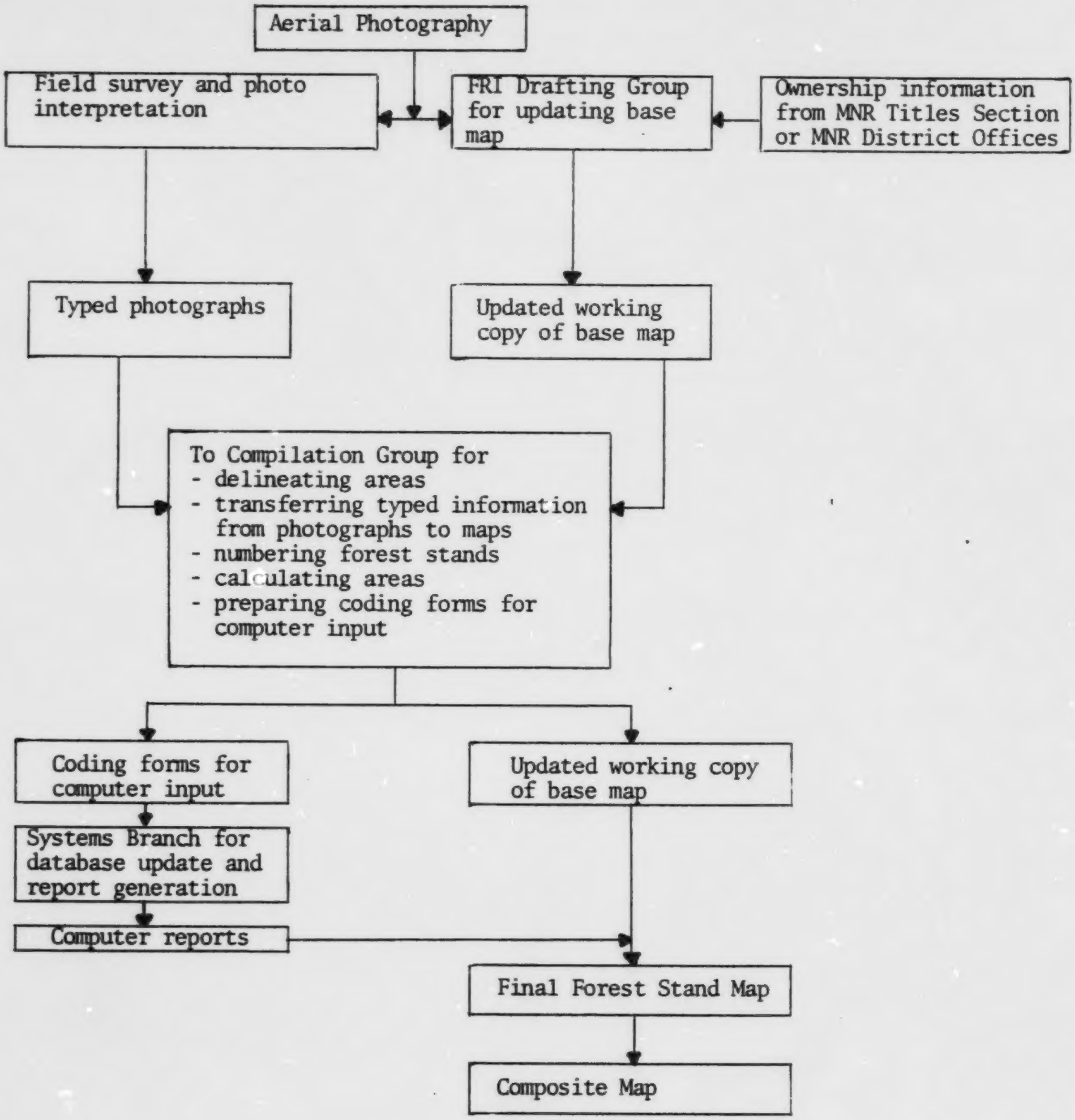
Hardware on-site at the FRI Unit is a 3278 IBM terminal. This has arrived recently and has not been put to use. DEC Professional 350 microcomputers will be used to input and verify FRI data directly on the FRI site.

G.I.S. POTENTIAL

The ability to compose and present plans through the use of automated drafting capabilities; to access ownership data in the Registry Office through a terminal; and to carry out geometric analyses such as polygon overlay, polygon dissolve, transformations and area/perimeter calculations for the forest stand inventory via polygon analysis software, would improve the service delivery of this Unit.

Figure 10.2.1.1-B

The workflow diagram of the FRI Unit is as follows:


Aerial Photography
Field survey and photo interpretation
FRI Drafting Group for updating base map
Ownership information from MNR Titles Section or MNR District Offices
Typed photographs
Updated working copy of base map
To Compilation Group for
- delineating areas
- transferring typed information from photographs to maps
- numbering forest stands
- calculating areas
- preparing coding forms for computer input
Coding forms for computer input
Updated working copy of base map
Systems Branch for database update and report generation
Computer reports
Final Forest Stand Map
Composite Map

DATA SOURCE INFORMATION SHEET

TITLE: FOREST RESOURCES INVENTORY

SOURCE AGENCY: MNR Forest Resources Group
Timber Sales Branch
PERSON: Brian Cardwell, Supervisor
TITLE: FRI Unit, Room 3544
ADDRESS: Whitney Block
Queen's Park
Toronto, Ontario

PHONE: 965-6914

DESCRIPTION: Inventory of Forest Resources in Ontario

FORMAT:

	M	A	MEDIA
MAP	x		
TABULAR		x	disc, tape
IMAGE	x		aerial photos
TEXT			
LIBRARY	x		Air Photo Library

NOTE:

SCALE: Map Scale 1:15 840

ACCURACY/RESOLUTION:

SIZE/VOLUME: 5500 maps

GROWTH RATE: NIL (update only)

DATA ITEMS: forest district, management unit, township or base maps, ownership, area class, year cruised, stand number, stand area in hectares/acres, tree species, stand age, stand height, site, stocking

RETRIEVAL KEY(S): Township name or base map #
Forest District
Management Unit
Stand No.
Ownership

GEOCODE:
Township name or base map No.
Forest District

DATE OF CREATION:

FREQUENCY OF UPDATE: 20 Years

COVERAGE/COMPLETENESS: Province-wide completed (update cycle in progress)

SOURCE OF INFORMATION:
FRI Planimetric maps
Aerial photos
Field Surveys and photo-interpretation

USERS OF INFORMATION:
Management
Forest Product Companies
Individual Foresters
Public (maps and photos through map office)

VOLUME/FREQUENCY OF USE: Daily

ACCESS METHOD FOR USER: MNR Map Office

AVAILABILITY: Maps and air photos available through Map Office. Database for inhouse use only

CHARGES:

Maps	$2.00
Photos	$2.00

HARDWARE AND LOCATION: IBM mainframe at Queen's Park Computing Branch - one IBM 3278 terminal in Room 3540, Whitney Block

SOFTWARE: inhouse developed

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

-would prefer direct access to ownership information from Titles Section
- will welcome ideas on automation on drafting and compilation processes

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: FOREST RESOURCE INVENTORY

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Produce & Revise Maps								
	& Build Tabular Database		●	●	●	●	●		●
2	Compile Maps & Tabular								
	Data	○	●	●	●				

AGENCY FUNCTIONS		CARTOGRAPHIC DATA						
		GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Produce & Revise Maps							
	& Build Tabular Database							
2	Compile Maps & Tabular							
	Data	○			●	●		

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Produce & Revise Maps														
	& Build Tabular Database	●													
2	Compile Maps & Tabular														
	Data	●		●		●						●			

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Produce & Revise Maps														
	& Build Tabular Database														
2	Compile Maps & Tabular														
	Data														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Produce & Revise Maps										
	& Build Tabular Database			●	●	●	●				●
2	Compile Maps & Tabular										
	Data										

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Produce & Revise Maps													
	& Build Tabular Database													
2	Compile Maps & Tabular													
	Data	○	○			○	○							

10.2.1.2 FORMAGAIN UNIT FORMAGAIN SYSTEM

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Forest Management Agreement and Information Unit is to provide and maintain a data base of forest resource information pertaining to the status of forest management activities in forest management agreement areas. The status of management refers to forest inventory, predictions, plans, demands, actions and/or results. A staff of 10 is currently employed to carry out the tasks involved in fulfilling this mandate.

TASKS/SYSTEMS

The FORMAGAIN Unit performs several tasks for forest management agreement areas only. These tasks are as follows:

1. Prepare Forest Management Plans

    a. The Unit digitizes FRI and OBM maps using software developed at the University of Guelph and enhanced in-house.

    b. FRI attribute tapes, which consist of the raw data used in the FRI Unit to produce the FRI ledger, are loaded into the FORMAGAIN ("Intermediate" Files). These intermediate files were developed at the University of Guelph and have been considerably enhanced in-house. The files are formatted such that the forest stand number and map sheet act as keys.

    c. Using the attribute information in the files, the annual allowable cut calculation can be determined. The annual allowable cut refers to the amount of forest cover which can be logged within a given area in a given time period.

    d. Through the use of these files, "enhanced" maps are produced. These maps are equivalent to the hand-colouring of allowable cut information on FRI maps in the field.

    e. The annual allowable cut calculation and the "enhanced" maps are used to determine the allocation of an allowable annual cut. This process consists of determining where on the map an allowable cut can be made. This is currently a manual system.

    f. The allocation of allowable cut information is used in conjunction with demands and constraints from other users to develop various forest management plans. Such plans include Management, Operating and Annual Plans. The Management Plan is developed on a 20-year cycle and the Operating Plan works on either two 10-year or four 5-year plans. These plans are currently manually produced by field foresters and sent to the Management Planning Section in the

Timber Sales Branch for approval. It is hoped that increased human and technical resources, e.g., word processing and electronic mail, will aid this function.

The above tasks all deal with the planning functions of the Unit. Subsequent to planning, a variety of forestry actions are implemented by the field.

2. Prepare Forest Action Report

a. Any actions implemented in the field, including such things as depletion, road access, site preparations, regeneration, trend, and assessment, are recorded in the form of a paper report and map. These reports outline what has actually happened at the site, and are sent to this Unit.

The results of these reports serve three purposes:

(i) The reports are compared to the original plan. This is a manual process wtih the anticipation to automate in the future.

ii) The reports are used to provide payment to the private company that has implemented the forestry action. It is a legal requirement that each private company submit a report which outlines the action taken with respect to forest management.

iii) Finally, these reports are used to update the FRI maps and files. Currently, this information is being updated on a 20-year cycle at head office and on an annual cycle in the field. It is anticipated that this manual system can be replaced using the automated data base and data capture routines.

3. Respond to Public Queries

a. There are a number of ad hoc inquiries of this forest resource information. In answering some of these inquiries, various geographic data management procedures could be readily applicable.

For an illustration of the workflow see Figure 10.2.1.2-A.

Although many of these tasks are completed manually, the Unit is moving towards automation. In this regard, a variety of hardware has been purchased (see the Appendix) and software has been developed both in-house and at the University of Guelph. The original software produced at the University has since been enhanced in-house. FORMAGAIN software is a forestry customized set of routines from the Georef System of MNR's Lands and Waters Group. The software is primarily written in C (95%) and Fortran and is run under the Unix operating system. Processes currently include data capture, editing, transformation and rotation into Lambert Conformal map projections, data base loading, standard report generation, and plotting of forest stand maps. Still under development are such things as refinements of the above processes, polygon editing, polygon overlay, enhanced mapping, corridor generation, map merging, and a generalized query language.

There are many uses of the FORMAGAIN maps, including land use planning, wildlife management, fire control and aviation, and site selection by Ontario Hydro. In the past, the forestry maps have been the only adequate coverage in Ontario, thus many of the users employ the map as a base for superimposing their own thematic data.

OBSERVATIONS

Many of the tasks performed by the Unit could easily be implemented on an automated system. The movement towards automation is under way. However, it is felt that the lack of human and technical resources has hindered the developent of a fully automated system. It is believed that in-house development presents a number of constraints. In hindsight, the Unit would have preferred to buy a fully operational system from private industry. Constant development results in lack of time for the programming personnel to become more aware of the changing technology in private industry.

FUTURE NEEDS AND WANTS

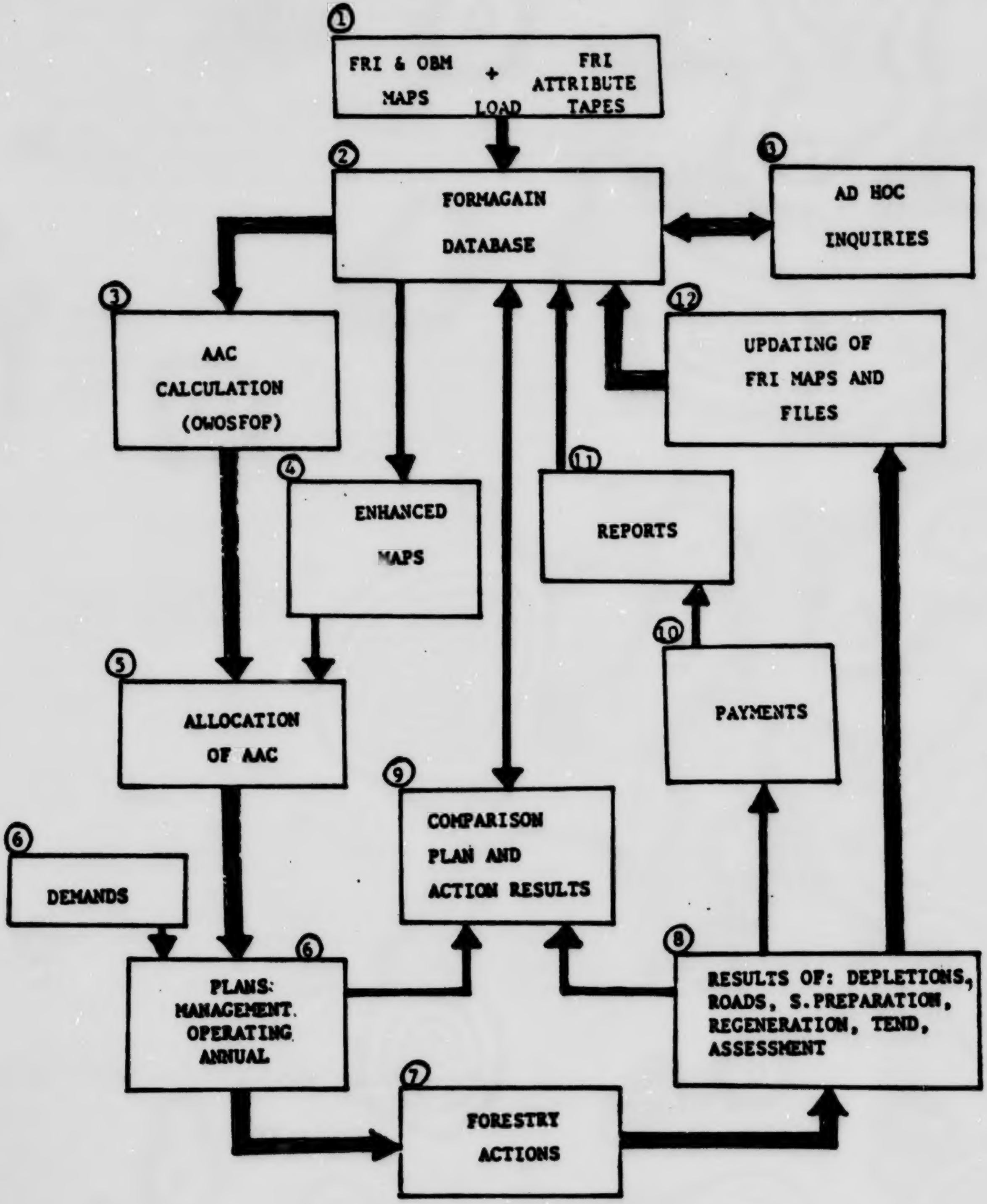
The future needs of this Unit include the incorporation of a geocode to identify forestry polygons. Coverage will be completed using either FRI or OBM. Currently, no common borders between OBM or FRI bases exist nor are they likely for 4 - 6 years.

G.I.S. POTENTIAL

As indicated by the Unit's research and development in G.I.S. systems, it is apparent that the Unit would be able to fulfill its mandate more effectively using G.I.S. capabilities. The variety of functions performed by the FORMAGAIN Unit readily lend themselves to generic G.I.S. capabilities. For example, polygon overlay could be used to update inventory data subsequent to a forest fire or any other cause of changes. Polygon dissolve techniques are already used in reporting on large areas. Point in polygon searches would be applicable for identifying the number of forest stands in given areas. Buffering/corridoring techniques would be helpful in the design of access roads, while windowing would be useful in site management activities. Line length calculations would also be helpful for determining accessibility of forest stands.

In response to public queries, these various tools would be particularly useful for prompt and accurate replies.

Figure 10.2.1.2-A


①
FRI & OBM MAPS
+
FRI ATTRIBUTE TAPES
LOAD
②
FORMAGAIN DATABASE
⑬
AD HOC INQUIRIES
③
AAC CALCULATION (OWOSFOP)
④
ENHANCED MAPS
⑪
REPORTS
⑫
UPDATING OF FRI MAPS AND FILES
⑤
ALLOCATION OF AAC
⑩
PAYMENTS
⑥
DEMANDS
⑨
COMPARISON PLAN AND ACTION RESULTS
⑥
PLANS: MANAGEMENT. OPERATING ANNUAL
⑧
RESULTS OF: DEPLETIONS, ROADS, S.PREPARATION, REGENERATION, TEND, ASSESSMENT
⑦
FORESTRY ACTIONS

FORMAGAIN THE SYSTEM COMPONENTS

DATA SOURCE INFORMATION SHEET

TITLE: FORMAGAIN

SOURCE AGENCY: Forest Management Information
PERSON: Dr. J. E. Osborn
TITLE: Supervisor
ADDRESS: Whitney Block

PHONE: 5-6914

DESCRIPTION: Forestry inventory both on maps and in tabular format

FORMAT:

	M	A	MEDIA
MAP	x	x	paper, tape
TABULAR	x	x	tape
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1:15 480; 1:10 000 (OBM)
Eastern Ontario

ACCURACY/RESOLUTION: As applicable by FRI
relative accuracy - satisfactory
absolute accuracy - low

SIZE/VOLUME: 100 FRI maps to date (digitized) (5,500 FRI paper maps)

GROWTH RATE: 100 FRI maps per year

DATA ITEMS: planimetric and topographic features
forest stand polygons

RETRIEVAL KEY(S): Township/base map, management unit, working circle, working group, stand number

GEOCODE: Township, base map

DATE OF CREATION: 1982

FREQUENCY OF UPDATE: Currently, 20 years; intention is for annual update

COVERAGE/COMPLETENESS: Areas of Forest Management Agreements, Northern Ontario 80,000 - 85,000 sq. miles

SOURCE OF INFORMATION: FRI unit

USERS OF INFORMATION: Land use planners, wildlife, fire & aviation, Ontario Hydro, and most field operations requiring a larger scale map (not 1:50,000 NTS), forest managers

VOLUME/FREQUENCY OF USE: Used on a regular basis currently figures vary, higher potential when computerized

ACCESS METHOD FOR USER: Reports, map and telephone inquiries

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: 2 Perkin-Elmer 3230 CPUs, 2 dual density tape drives, on-line printer, 7 GTCO digitization tables, 3 colour rasters Tektronix 4027, 2 Nicolet-Zeta digital plotters

SOFTWARE: University of Guelph developed, enhanced in-house

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
The unit felt that it could not satisfy all ad hoc inquiries

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: FORMAGAIN

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

	AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA: GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Prepare Forest Management Plans		●	●	●	●			○		●					●
2	Prepare Forest Action Reports	●	●	●	●	●			◐				●			
3	Respond to Public Queries															

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA: MANIPULATION / ANALYSIS: GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Prepare Forest Management Plans	◐		●	◐	□	◐	◐			□	◐			
2	Prepare Forest Action Reports				○		◐	◐				●			
3	Respond to Public Queries	◐		●	◐	□	◐	◐				●			

	AGENCY FUNCTIONS	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Prepare Forest Management Plans													◐	◐
2	Prepare Forest Action Reports													◐	◐
3	Respond to Public Queries													●	●

	AGENCY FUNCTIONS	DISPLAY: COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION TEXT
1	Prepare Forest Management Plans	●	●	●	●	●	●				●
2	Prepare Forest Action Reports						●				●
3	Respond to Public Queries										

	AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Prepare Forest Management Plans													
2	Prepare Forest Action Reports													
3	Respond to Public Queries													

10.2.2 FOREST RESOURCES BRANCH
FOREST PRODUCTION AND CONTROL SECTION

FOREST PRODUCTION POLICY UNIT
SILVICULTURE INFORMATION AND REGENERATION ASSESSMENT SYSTEMS

ORGANIZATION AND RESPONSIBILITIES

The Forest Production Policy Unit is responsible for the maintenance and co-ordination of provincial records on silviculture work and regeneration assessment. The Unit uses this information to formulate forest management policies for Ontario and provide vital statistics.

Silviculture information is a system of historic records and statistics of silvicultural activities on a specific area, such as; logging, site preparation, planting and seeding. Supplementary information includes: soil type, soil depth, moisture regime, species, number of trees, age and grade of stock, supplying nursery, method of handling, time of planting, and so forth.

A staff of three maintain these inventories.

TASKS/SYSTEMS

The tasks performed in fulfilling the Forest Production Policy Unit's responsiblities are as follows:

1. Collect and Maintain Silviculture Information

a. After logging has been completed in an area, the Unit Forester or the field staff visit the site and collect data required for making decisions regarding silviculture treatment (e.g., soil type, size of tree stumps remaining, remaining vegetation cover, etc.).

b. Based on this data, the Unit Forester recommends the type of silviculture treatment and type of equipment required for regeneration of the area.

c. The recommendation is forwarded to the private company that logged the area or is used by Ministry officials for implementation.

d. Silviculture treatment is then carried out.

e. The Unit Forester ensures treatment is completed and fills out the standardized form for silviculture information and treatment (see the Appendix). The forms are sent to the Forest Production Policy Unit.

f. The Unit sends these reports to private contractors for reformatting in digital form.

g. The data is returned to the Unit on a tape in digital form and is then sent to the Queen's Park Computer Centre for batch processing onto the

IBM mainframe.

h. Statistical analysis (e.g., number of trees planted and seeded per hectare, etc.) is run on the data and a standard report generator (MARK IV) is used to generate summary reports (see the Appendix).

i. The information is used to determine province-wide forest management policy.

The procedures in this workflow are illustrated in Figure 10.2.2-A.

2. Collect and Maintain Regeneration Assessments

Five to ten years after the silviculture treatment, a regeneration assessment to determine the effect of the treatment is conducted by the districts. Recording of this information is outlined in the following tasks:

a. A survey of the accomplishments of earlier silviculture is recorded by the district on standard report forms (see the Appendix).

b. If the regeneration assessment indicates success, the information is used for future timber production expectations.

c. If the regeneration assessment indicates failure of the treatment, the site reverts back for retreatment using another technique.

d. Once the regeneration assessment is complete, the districts send their reports to the Unit where it is contracted out for digital reformatting.

e. Statistical analysis is used in conjunction with a standard report generator to produce summary reports. The following is a list of the reports generated by the Unit:

   1. summary of stocking and regeneration analysis;
   2. rating of regeneration success by working group (tree type);
   3. survival summary of plantation assessment;
   4. area surveyed by region and regeneration method;
   5. seeding assessment summary; and
   6. various transaction losses and records.

For a complete listing of reports, see the Appendix.

Three types of information are provided in these reports:

- **Stocking** - information on species type and density within a given area
- **Survival** - information on survival records of planted trees by species
- **Seeding** - information on percentage stocking, the number of dead trees and the number of trees germinated

Users of the report data include staff within the Forest Resources Group for forest production forecasting and ad hoc queries from students, universities and other interested members of the public. The reports are generated and distributed to the districts annually. The information from the reports is also included in the Minister's Annual Report.

OBSERVATIONS

Direct data input from the field to the automated data base via field office computer terminals would provide a more efficient and accurate data entry and update procedure.

FUTURE NEEDS AND WANTS

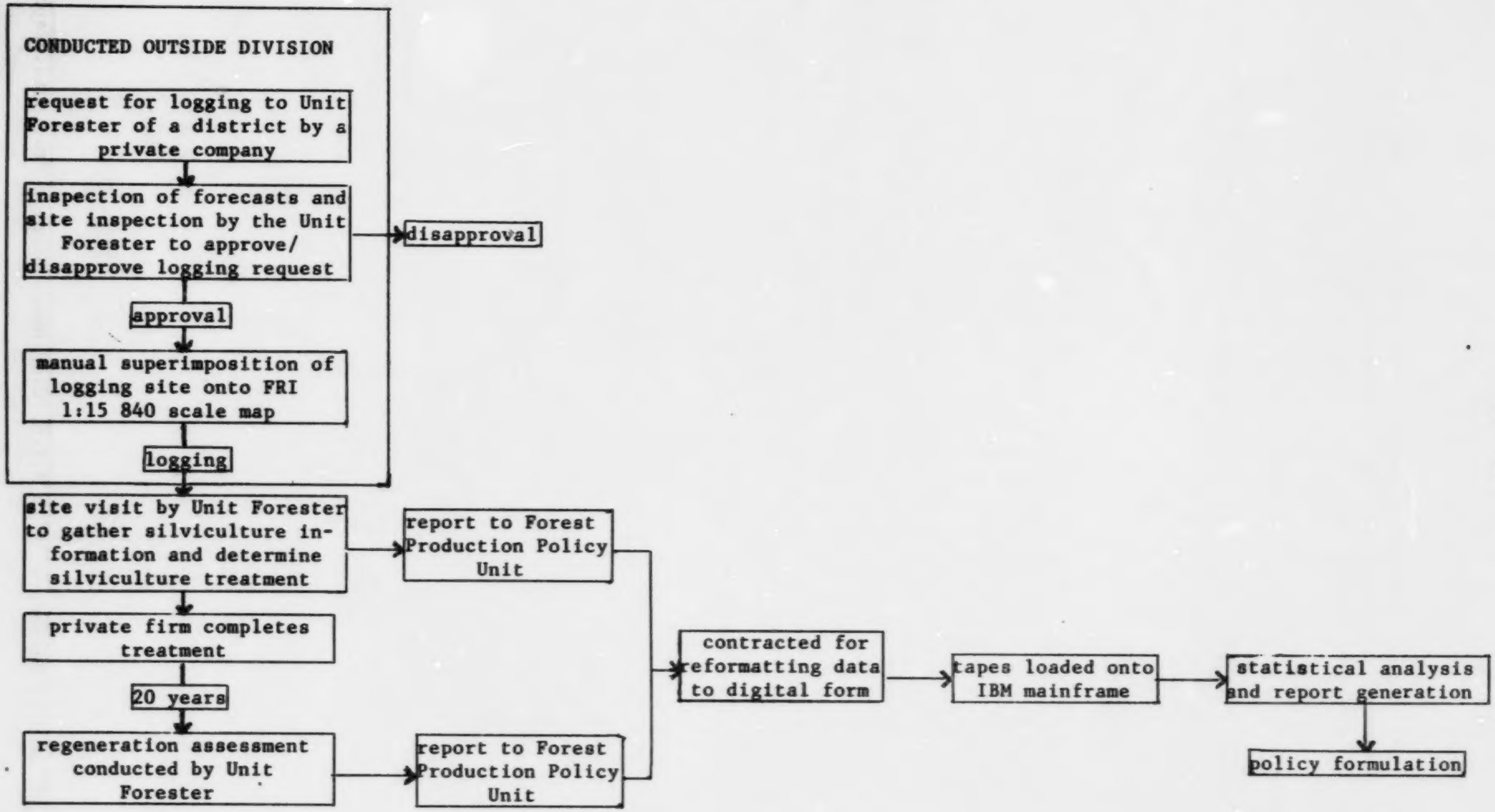
There were no future needs and wants for maintenance of the two inventories indicated by the Forest Production Policy Unit.

G.I.S. POTENTIAL

If a G.I.S. system were available, the inventory maintenance could be completed by the district offices. Many of these benefits of a G.I.S. system could be realized at the district level. For example, a polygon overlay capability would be useful in providing an accurate representation of the logging site on the FRI base map. Area/perimeter calculations would also be of benefit in determining seeding and planting per hectare and in calculating regeneration success per hectare. The ability to window on the logging site would also be beneficial by offering the capability to work with explicit information from the individual logging area.

Figure 10.2.2-A

WORKFLOW FOR SILVICULTURE TREATMENT


CONDUCTED OUTSIDE DIVISION
request for logging to Unit Forester of a district by a private company
inspection of forecasts and site inspection by the Unit Forester to approve/disapprove logging request
disapproval
approval
manual superimposition of logging site onto FRI 1:15 840 scale map
logging
site visit by Unit Forester to gather silviculture information and determine silviculture treatment
report to Forest Production Policy Unit
private firm completes treatment
20 years
regeneration assessment conducted by Unit Forester
report to Forest Production Policy Unit
contracted for reformatting data to digital form
tapes loaded onto IBM mainframe
statistical analysis and report generation
policy formulation

DATA SOURCE INFORMATION SHEET

TITLE: Silviculture Information

SOURCE AGENCY: Forest Management Branch

PERSON: M. A. Chaudhry, B.Sc.F.,R.P.F.
TITLE: Assessment Specialist
ADDRESS: Whitney Block, Room 3651
Queen's Park
Toronto, Ontario
M7A 1W3
PHONE: (416) 965-2575

DESCRIPTION:

FORMAT:

	M	A	MEDIA
MAP	x		FRI Base Map
TABULAR		x	on disc and tape
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1":400'

ACCURACY/RESOLUTION: as per district information

SIZE/VOLUME:

GROWTH RATE: 8,000 report forms annually

DATA ITEMS: district code, management unit, ownership code, regeneration code, degree of competition, competing vegetation, recommendation, seeding pattern, seeding device, site equipment, S.I.F. pattern, seeding rate, species code, working group code and distribution

RETRIEVAL KEY(S): management unit

GEOCODE:

DATE OF CREATION:

FREQUENCY OF UPDATE: annually

COVERAGE/COMPLETENESS: Ontario Crown lands and private lands under agreement

SOURCE OF INFORMATION: districts

USERS OF INFORMATION: districts, Forest Resources Group, university students, other interested members of the public

VOLUME/FREQUENCY OF USE: reports generated annually, other ad hoc inquiries

ACCESS METHOD FOR USER: through reports

AVAILABILITY: general

CHARGES: none

HARDWARE AND LOCATION: IBM Mainframe, Queen's Park

SOFTWARE: report generator, created for Silviculture

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Forestry HNR

Silviculture/ Regeneration

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Collect and Maintain Silviculture Information	○	●	●	●	●	●		●
2	Collect and Maintain Regeneration Assessment	○	●	●	●	●	●		◐

AGENCY FUNCTIONS		CARTOGRAPHIC DATA: GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Collect and Maintain Silviculture Information							
2	Collect and Maintain Regeneration Assessment							

AGENCY FUNCTIONS		MANIPULATION / ANALYSIS: GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Collect and Maintain Silviculture Information	◐						◐				◐			
2	Collect and Maintain Regeneration Assessment	◐						◐				◐			

AGENCY FUNCTIONS		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Collect and Maintain Silviculture Information														
2	Collect and Maintain Regeneration Assessment														

AGENCY FUNCTIONS		DISPLAY: COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Collect and Maintain Silviculture Information	◐				◐	◐				◐
2	Collect and Maintain Regeneration Assessment	◐									

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Collect and Maintain Silviculture Information													
2	Collect and Maintain Regeneration Assessment													

10.3 LANDS AND WATERS GROUP

The Lands and Waters Group is responsible for the development and use of lands and waters within the public (Crown land) and limited private domains. In this capacity, the Group acts as an administrative and co-ordinating agency to ensure optimum social and economic benefits for the people of Ontario. This Group examines all relevant information concerning land use and determines priorities for the land use of various areas within the province.

To facilitate this mandate five branches have been formed. The branches relevant to the User Needs Study include: The Land Management Branch, Surveys and Mapping, Land Use Co-ordination, and Conservation and Water Management.

The Land Management Branch is responsible for:

1. managing Ontario's Crown lands, which involves maintaining the quality of Crown lands;
2. ensuring the orderly development of Crown lands, which deals with economic and recreational development and heritage conservation;
3. providing adequate access routes for tourist, forestry, mineral or fishery access;
4. encouraging orderly private development of Crown lands for the purpose of mining, logging and recreational land development; and
5. providing Crown land for recreational uses.

The mandate of the Surveys and Mapping Branch is to develop and maintain a geographical referencing system. This system includes surveys, such as horizontal control survey networks, geographical referencing standards and the production of the Ontario Basic Maps. In carrying out this mandate there are ten sections: Surveys, Geographical Referencing, Cartography, Cartographic Supervisors, Drafting Services, Supervising Draftsmen, Ontario Basic Mapping, Nomenclature, and the Ontario Centre for Remote Sensing.

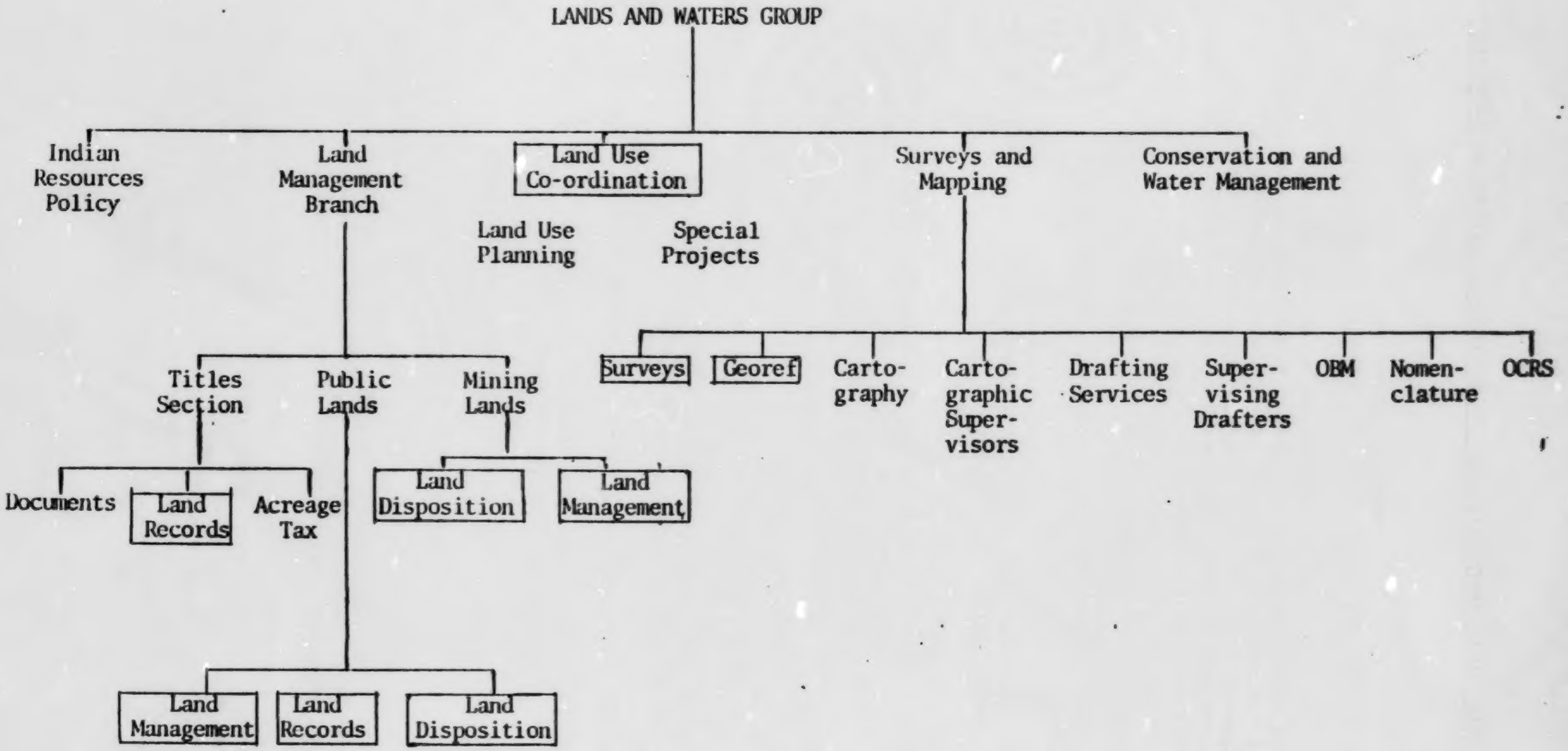
The Land Use Co-ordination Branch was created to develop methodologies for describing, maintaining and administering land use policies within the Ministry of Natural Resources.

The mandate of the Conservation and Water Management Branch is:

1. to maintain and improve the ability to forecast water levels and to respond to flood emergencies;
2. to identify hazardous areas where flood and erosion may occur;
3. to evaluate potential uses for water including recreation, hydro-electric power and other industrial and community uses;
4. to conserve water and soil, using land management activities; and
5. to encourage recreational use of flood plains and other lands acquired for water management.

The organizational structure of the Lands and Waters Group is depicted in Figure 10.3-A, which follows.

Figure 10.3-A


LANDS AND WATERS GROUP
Indian Resources Policy
Land Management Branch
Land Use Co-ordination
Surveys and Mapping
Conservation and Water Management
Land Use Planning
Special Projects
Titles Section
Public Lands
Mining Lands
Documents
Land Records
Acreage Tax
Land Disposition
Land Management
Land Management
Land Records
Land Disposition
Surveys
Georef
Carto-graphy
Carto-graphic Super-visors
Drafting Services
Super-vising Drafters
OBM
Nomen-clature
OCRS

10.3.1 CONSERVATION AUTHORITIES AND WATER MANAGEMENT BRANCH SERVICES SECTION

EMERGENCY CO-ORDINATION UNIT FLOODPLAIN MAPPING SYSTEM

ORGANIZATION AND RESPONSIBILITIES

One of the responsibilities of the Emergency Co-ordination Branch is to develop policies for flood plain mapping by Conservation Authorities. The Branch also provides technical advice and oversees research and development in hydrology and hydraulics. The Branch provides a very important service role in terms of auditing all contract work for the Conservation Authorities and in providing funding to assist Conservation Authorities in carrying out their mapping plans.

The primary motivation for flood plain mapping is to identify areas of flood hazards. As such, the data becomes very important for planners, municipalities, regional governments and the private sector.

TASKS/SYSTEMS

Three tasks are carried out regarding flood plain mapping, and are described as follows:

1. Flood Plain Policy Formulation

The Branch is involved in establishing criteria for the determination of hazard areas, requiring tabular data manipulation.

2. Generate Request for Proposal Studies

A Conservation Authority makes a request for flood plain mapping in its area to the Conservation Authorities and Water Management Branch. A proposal for mapping is prepared by the Branch in conjunction with the Conservation Authority. The proposal is responded to by consulting engineers in the private sector. A contractor is selected and proceeds to conduct flood plain mapping, using standard survey practices, and aerial photographs.

3. Provide Technical Advice and Auditing

The Branch monitors and audits progress of the flood plain mapping in conjunction with associated local government bodies. Products are audited to ensure that all mapping standards are achieved. Technical advice is provided for mapping projects as needed.

The final products (maps and reports) remain with the Conservation Authorities. The flood plains are superimposed on mapping which exists for the area. OBM maps are used when available.

The final report is presented to a Regulation Committee of Cabinet and, if accepted, is publihsed in the Ontario Gazette and becomes an Ontario Regulation for the specific Conservation Authority as a registered document.

OBSERVATIONS

In order to standardize flood plain mapping across the province, there is a need for a good conventional topographic map for each Conservation Authority area, such as OBM maps. Much of the responsibility for flood plain mapping lies with the Conservation Authorities.

FUTURE NEEDS AND WANTS

The Branch requires accurate topographic coverage of Conservation Authority areas in order to have a good base to superimpose flood plain information.

G.I.S. POTENTIAL

Operationally, the current manual system could conceivably be provided digitally, thereby achieving the Branch's tasks more effectively and efficiently. In particular, digital information could be used in a comprehensive land-related information system for flood plain analysis and mapping. Since the flood plain data is used by a large number of people and is the only source of flood hazard land information, a geographical information system could facilitate easy access to the flood plain data.

To determine hazard areas and portray or retrieve them graphically, the polygon overlay, polygon dissolve and transformation techniques would be very useful.

In providing technical advice, the Branch could benefit from such capabilities as flow simulation and digital terrain modelling to determine flood plain levels. In particular, it is conceivable that 3-D viewing, spatial interpolation, slope/aspect ratio and watershed analysis would aid in the determination of potential flood areas.

DATA SOURCE INFORMATION SHEET

TITLE: FLOODPLAIN MAPPING

SOURCE AGENCY: Conservation Authority
PERSON: Lewis J. Balogh
TITLE: Emergency Co-ordination
ADDRESS: Whitney Block
Room 5632
Queen's Park
Toronto M7A 1W3
PHONE: (416) 965-6277
DESCRIPTION: floodplain maps

FORMAT:

	M	A	MEDIA
MAP	X		
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1:2000 maximum

ACCURACY/RESOLUTION: high accuracy consistent with legal liability of contractor
SIZE/VOLUME: variable according to Conservation Authority

GROWTH RATE: 300 miles of watershed per year across province
DATA ITEMS: coordinate position, extent of floodplain

RETRIEVAL KEY(S): N/A

GEOCODE: Conservation Authority, Drainage System

DATE OF CREATION: 1970

FREQUENCY OF UPDATE: as required

COVERAGE/COMPLETENESS: mostly Southern Ontario

SOURCE OF INFORMATION: flow metre, Ontario Hydro, municipalities, Conservation Authorities, stream flow data

USERS OF INFORMATION: other ministries, planning, municipalities, utility companies, consulting engineers, private sector

VOLUME/FREQUENCY OF USE: used as reference

ACCESS METHOD FOR USER: map and consultant's reports at Conservation Authority

AVAILABILITY: open

CHARGES: for reproduction

HARDWARE AND LOCATION: map storage at local Conservation Authority

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
validity of data is based on contractor specification and time of study; updates only on demand

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: FLOODPLAIN MAPPING

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

		TABULAR DATA								CARTOGRAPHIC DATA																				
										GENERATION						STORAGE	MANIPULATION / ANALYSIS													
																	GEOMETRIC ANALYSIS													
	AGENCY FUNCTIONS	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	policy formulation					o																								
2	generate request																													
	for proposal study																													
3	provide technical					o	o																o				o			
	advice and auditing																													

		CARTOGRAPHIC DATA																							IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		MANIPULATION / ANALYSIS														DISPLAY																						
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
	AGENCY FUNCTIONS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	policy formulation																																					
2	generate request															o		o		o	o				o													
	for proposal study																																					
3	provide technical		□		□	●	□			□			□			o		o		o	o				o													
	advice and auditing																																					

10.3.2 LAND MANAGEMENT BRANCH

10.3.2.1 EASTERN ONTARIO MINING DIVISION MINING RECORDER REPORTS

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Mining Recorder is to administer the Mining Act through the recording and cancellation of mining claims. In this capacity, the Mining Recorder maintains all relevant information with respect to prospector's licences, mining claims and preparation of leases.

Each Mining Division is staffed by a Mining Recorder who administers the Mining Act for the Division. The responsibilities and functions of the Mining Recorders are the same for all Mining Divisions.

TASKS/SYSTEMS

Relevant tasks carried out by the Mining Recorder include the following:

1. Issue Prospector's Licences

Prospector's licences are issued by the district offices and must be renewed annually. In order to obtain a prospector's licence, an individual must visit the Mining Recorder Office in the respective mining division and fill out an application form. The Mining Recorder Office then issues a licence after ensuring that the individual does not have another licence. This is done by examining the Prospector's Licence Index. All companies must obtain prospector's licences by applying to the Eastern Ontario Mining Division.

The Prospector's Licence Index is an index of all licence holders in Ontario and is maintained at each Mining Recorder Office. Each office is responsible for informing other offices of changes and updates to their own index of prospector's licences. Since only one licence may be isued to an individual or company, it is imperative that the index of licensees remain current at all times. It is important to note that although companies cannot stake claims, they must have a valid prospector's licence in order to have mineral interests transferred to them from an individual (see the **Appendix**).

2. Recording Mining Claims

The process of acquiring an interest in a mining property involves four steps:

1) **Staking**
   - a prospector with a valid licence can stake a single claim of up to 40 acres in unsurveyed areas. (The prospector can stake an unlimited number of these 40-acre claims).
   - in surveyed townships, areas are defined under Section #42.

2) **Recording** - the claim is recorded with the Mining Recorder by completing an application form (see the **Appendix**).

3) **Identifying and describing the parcel** - depending on whether the claim is located within an unsurveyed or surveyed township, the requirements for description vary. In a surveyed township that is not affected by water or roads, the claim can be described using a legal description. In an unsurveyed township or in affected surveyed townships, the area must be surveyed by an Ontario land surveyor before coming to lease.

4) **Completing claim work** - in order to satisfy the requirements for granting of a lease, 200 days of work must be done on the claim. If the work is not completed in compliance with the Mining Act, there is a forfeiture on the claim. The work must usually be completed within 5 years, however, a yearly extension can be granted for up to a maximum of 11 years (see the **Appendix**).

The claims application requires a sketch of the claim. A copy of the sketch is sent to the Drafting Unit of the Surveys and Mapping Section, Ministry of Natural Resources, for updating the M-Plan. M-Plans, at a scale of 1 inch to 40 chains, are part of a Land Index series showing mining lands information. Included on the M-Plans are plots of patent and Crown lands, leases, roads, railways, shorelines and powerlines. The M-Plan also shows categories, namely, mining rights only, surface rights only and mining and surface rights on the parcels. The M-Plans are available through the Surveys and Mapping Branch.

3. Prepare Leases

Once the mining claim is recorded, leases are prepared which document mining and surface rights. This process is essentially administrative in nature.

4. Prepare Monthly and Yearly Reports

The public have access to this information, including the M-Plan, through counter inquiries. The Mining Recorder handles several such inquiries each day. The data stored and maintained by the Mining Recorder is also sent to the Ontario Geological Survey Section in summary format, e.g., monthly and yearly business reports, to be input into an automated system (see the **Appendix**).

OBSERVATIONS

The importance of the data stored and maintained by the Mining Recorder Office requires that it be current and accurate. The Mining Recorder must be aware of licence expiration dates, forfeitures and work completed on claims for lease. To manage all of this data, a very efficient manual system has been developed, however, with the advent of automation, much of this data could be stored and maintained in digital format. By having this data available digitally and establishing a network between Mining Recorder Offices, duplication of Prospector's Licence Indices could be avoided and updating of licence and claim information could be simplified.

FUTURE NEEDS AND WANTS

A pilot project for automation is currently being developed for the Timmins Mining Recorder Office. A feasibility study has been completed by the Ministry of Government Services. The automated system will initially record claims, prospector's licences and claim worksheets. Ultimately, it is conceivable that all of the offices will be interconnected in a network so that access to all records in Ontario would be available from any office.

G.I.S. POTENTIAL

This component of a land-related information system is particularly important for mineral resource management and planning. Access to this information via generalized query language would provide the capability for a resource management information system.

Potentially, the sketch required in the claim application could be digitized by the Mining Division. In this way, the information would be available for subsequent access by MNR personnel for planning activities.

DATA SOURCE INFORMATION SHEET

TITLE: Mining Recorder Records (Eastern Ontario Mining Div.)

SOURCE AGENCY: Mining Recorder

PERSON: Mrs. Raili Charnesky

TITLE: Mining Recorder

ADDRESS: Whitney Block
Room 2548
Queen's Park
Toronto, Ontario M7A 1W3

PHONE: (416) 965-1322

DESCRIPTION: 1) mining claims records
2) index of prospector's licences

FORMAT:

	M	A	MEDIA
MAP	X		M-Plan
TABULAR	X		
IMAGE			
TEXT			
LIBRARY		X	microfiche

NOTE:

SCALE: 1" - 40 chains

ACCURACY/RESOLUTION: as per M-Plan

SIZE/VOLUME: 1) active claims from 1,000-25,000; 2) archive of forfeiture on microfilm from 1900's; 3) prospector's licence index 4,500 records

GROWTH RATE: 1) depends on district 10's to 100's; 2) prospector's licence records 100's/year

DATA ITEMS:

1) prospector's licences - licensee name, date of licence, licence number
2) claims - name of applicant, prospector's address, date, mining division, township

For full description see Appendix

RETRIEVAL KEY(S): 1) claims - prospector's licence, township, tag number, claim number; 2) licences - prospector's name

GEOCODE: township

DATE OF CREATION: early 1900's

FREQUENCY OF UPDATE: continual

COVERAGE/COMPLETENESS: Ontario in 9 mining districts

SOURCE OF INFORMATION: application form

USERS OF INFORMATION: internal to Ministry, public for claim queries

VOLUME/FREQUENCY OF USE: variable based on mining activity

ACCESS METHOD FOR USER: over counter inquiry

AVAILABILITY: general

CHARGES: search and reproduction costs

HARDWARE AND LOCATION: Mining Recorder Office; manual files

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: MINING RECORDER

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

	AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Issue Prospector's Licences	◐	◐	◐	◐			◐								
2	Record Mining Claims	◐	◐	◐	◐			◐								
3	Prepare Leases	◐	◐	◐	◐			◐								
4	Prepare Monthly & Yearly Reports								◐							

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA																
		MANIPULATION / ANALYSIS																
		GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1	Issue Prospector's Licences																	
2	Record Mining Claims																	
3	Prepare Leases																	
4	Prepare Monthly & Yearly Reports																	

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA																				
		MANIPULATION / ANALYSIS											DISPLAY									
		DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION				
		SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Issue Prospector's Licences																					
2	Record Mining Claims																◐		◐			
3	Prepare Leases																					
4	Prepare Monthly & Yearly Reports																					

	AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	DRAFT SKETCH OF CLAIM
1	Issue Prospector's Licences													◐
2	Record Mining Claims													
3	Prepare Leases													
4	Prepare Monthly & Yearly Reports													

10.3.2.2 MINING LANDS SECTION

ORGANIZATION AND RESPONSIBILITIES

The primary land-related responsibilities of this Section are twofold; firstly, to monitor the orderly disposition of mining land in the province, and secondly, to ensure that mining legislation is updated to reflect current economic records. In this capacity, a staff of three provide policy development and monitoring for mining legislation. In monitoring mining land disposition, a staff of one works part time to maintain two inventories: the Salt Mining leases and the Beach Protection Act licences.

At present, there is a move to decentralize the mining licence inventory to the district office level. With respect to this decentralization, this Unit's role will be one of providing expertise and guidance to the district offices for administering these licences. This Unit will also audit district performance to ensure conformity with regard to following policy guidelines statute interpolation.

TASKS/SYSTEMS

1. Administer Licences

The Mining Lands Section issues both Salt and Sand licences (required by the Beach Protection Act) for salt and aggregate removal. Both Salt and Sand Removal licensees report on a monthly basis with respect to the site of extraction (by township lot, concession and township), the quantity of the commodity removed, royalties on the commodity and, in the case of sand, the destination of the removed material. This information is entered and maintained on a cardex file. There is limited use of the M-Plan for locating extraction sites for reference purposes. The M-Plan is at a scale of 1 inch to 40 chains and includes information on mining lands. The map depicts patent and Crown lands, leases, roads, railways, powerlines and shorelines, etc. The tabular information is reported in the Mineral Review Book, which is published annually by the Ontario Geological Survey.

The total number of licences is very small, for example, there are three salt licences and twenty-five licences for the removal of sand from the beaches and from lakes or rivers. To ensure that mining legislation reflects current economic trends, the Section performs ad hoc queries of various district offices with respect to mining information and consults mining publications to become aware of trends in mining. There is also a continual dialogue with representatives from the mining industry.

OBSERVATIONS

At present, there is a move to decentralize inventory maintenance to the district offices. The Section has no apparent needs or wants for fulfilling its policy formulation responsibility. At this time, the mandate of this Section is best achieved using traditional manual methods because of the limited quantity of data maintained.

G.I.S. POTENTIAL

With the decentralization of the inventories and for decision making, a comprehensive geographical information system could be of minimal benefit for providing an information management capability for reporting and accessing mineral data. However, the limited scope of the Section's responsibilities would hardly warrant an individual system. Any G.I.S. potential will be realized in the district offices.

DATA SOURCE INFORMATION SHEET

TITLE: SALT LICENCES & BEACH PROTECTION ACT LICENCES

SOURCE AGENCY: Mining Lands

PERSON: Fred Matthews

TITLE: Mining Administrator

ADDRESS: Whitney Block
Room 6404

PHONE: (416) 965-6918

DESCRIPTION: Manual cardex system for maintaining licence information

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	x		cards
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: Salt licences 3
Beach licences 25

GROWTH RATE: Negligible

DATA ITEMS: Location of site, amount of commodity removed, destination for sand, source i.e. crown vs. private, royalty (sand)

RETRIEVAL KEY(S): Licence number

GEOCODE: None

DATE OF CREATION: 1955

FREQUENCY OF UPDATE: Monthly

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Licences

USERS OF INFORMATION: Internal

VOLUME/FREQUENCY OF USE: N/A

ACCESS METHOD FOR USER: N/A

AVAILABILITY: N/A

CHARGES: N/A

HARDWARE AND LOCATION: Office filing cabinet, Whitney Block

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGMENT PROCEDURES

TITLE:

Salt Licences
+
Beach Protection
Licence Act

AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA																																											IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
									GENERATION							MANIPULATION / ANALYSIS																												DISPLAY																						
																GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
Administer Licences		○	○	○				○																																																										Function migrating
																																																																		to field offices

10.3.2.3 PUBLIC LANDS SECTION TECHNICAL DISPOSITION FOR PRIVATE USES UNIT

10.3.2.3.1 COTTAGE LOT RECORDS SYSTEM

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Public Lands Section is to administer land dispositions for a variety of purposes, including: agriculture, commercial, cottage lots, and transfers of administrative control for specific lands to other ministries or federal agencies. A primary task involves identifying potential cottage sites and the subsequent disposition of the appropriate Crown land for these sites. A staff of one performs all tasks required for fulfilling this responsibility.

TASKS/SYSTEMS

1. Identify and Dispose of Cottage Lot Sites

In identifying and disposing of cottage lots the following steps are performed. When warranted by market conditions, a proposal is made by a district planner for a cottage development. This proposal must be consistent with MNR district land use plans, developed in accordance with the Policy and Planning Secretariat. Suitable cottage sites are selected by field staff using criteria set up by the Lake Planning Unit of the Land Management Branch. The cottage sites are chosen by comparing characteristics of possible sites to the criteria outlined, and determining the site's suitability to cottage development. Such criteria include soils, watershed, access, wildlife habitat, and so forth. Under the Planning Act the draft plan of subdivision must be submitted for approval to the Ministry of Municipal Affairs and Housing, which in turn circulates it to concerned government ministries and agencies, including the Ministry of Transportation and Communications.

After the plan has been approved, the site is manually superimposed on one of the Ministry of Natural Resources' Land Index Plans (G, M or T) by the Drafting Section of the Ministry of Natural Resources. These plans, at a scale of 1 inch to 40 chains, show patented and Crown lands and leases, roads, railways, shorelines, and powerlines.

It should be noted that all cottage lot records are maintained in the MNR district offices. Data source information retained in district offices is addressed in the Timmins Office Report in Chapter 10.6.3.

The plan of subdivision proceeds through a process of disposition including the documentation and registration performed by the Land Registry Office and the Titles Section of the Ministry of Natural Resources. This includes application for disposition, survey and incorporation into the Land Index Records which are maintained by the Titles Section.

OBSERVATIONS

The Public Lands Section functions primarily as a planning and technical support section. Its role is one of policy formulation and the monitoring of land dispositions for a number of uses. As such, it does not maintain any data. Data used to determine sites is located in district offices, and disposition data is located in the Land Registry Office and the Title Section of MNR.

As a planning section, the Public Lands Section requires an integration of information from a variety of sources. For the identification of potential cottage sites the Section relies on district field data for such things as soil type, vegetation, watershed characteristics, etc. and also relies on other sections within the Ministry of Natural Resources to supply information not available from the districts.

At this time, with constrained cottage site development, there are no immediate needs, although a potential exists for future development.

G.I.S. POTENTIAL

The Public Lands Section is a user of a variety of land-related information which is derived from many sources. As such, the integration provided by a comprehensive geographical information system would increase the Section's access to data required for carrying out their mandate. A G.I.S. system would provide assistance in carrying out this mandate, specifically, a polygon overlay package could be used to match criteria against site information and determine a suitable cottage lot site.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Cottage Site Allocation.

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Determining cottage lot sites	◐														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Determining cottage lot sites	☐													

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Determining cottage lot sites														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Determining cottage lot sites					◐	◐				◐

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Determining cottage lot sites													

10.3.2.3.2 LAKE PLANNING UNIT

ORGANIZATION AND RESPONSIBILITIES

As its mandate, the Lake Planning Unit has three main functions. The first of these is policy formulation, which involves the development of methodologies for land management. The Unit also provides technical support to the MNR regional offices. Thirdly, this Unit has an audit responsibility for the regions, which in turn are responsible for auditing the districts on the implementation of land use plans and policies.

At the provincial level, policy formulation is the primary concern, whereas the regional level deals mainly with formulating strategies for implementing these policies. Production or implementaiton of the land use policy is the responsibility of the district office. The Lake Planning Unit is staffed by two people.

The Lake Planning Unit works within the strategic land use plan as developed by the Ontario Strategic Land Use Plan (OSLUP). These plans are used by the regions for evolving strategies for land management. The regions then prioritize plans according to site specific factors. Each district is responsible for developing a detailed land management plan, as well as overseeing its implementation. This is conducted within the constraints of manpower, capital and other resources.

TASKS/SYSTEMS

1. Develop Lake Planning Methodology

The Unit has developed a structured methodology which is designed to implement the District Land Use Guidelines for those activities which fall within the orbit of land management. The formal methodology developed by the Unit is complete with specialized formats and forms for the various levels of the model. The model can be described in terms of the following components.

Level A - The primary purpose of this level is to provide a continuous array of the policies, strategies, objectives and targets for the many functions and subfunctions of the Land Management Program. It sets out the presence or absence of the policies, etc. at the provincial, regional and district level. It also provides a clear picture of what the district is expected to deliver to the base year 2000.

Level B - Level B is a structured strategy formulation technique in which, at a subdistrict, the optimum pathway is sought to achieve objectives. A null alternative is provided in which the area of search is progressively widened until it is clear that the only solution is to adjust the target. This level requires qualitative data analysis. Figure 10.3.2.3.2-A provides and example of Level B.

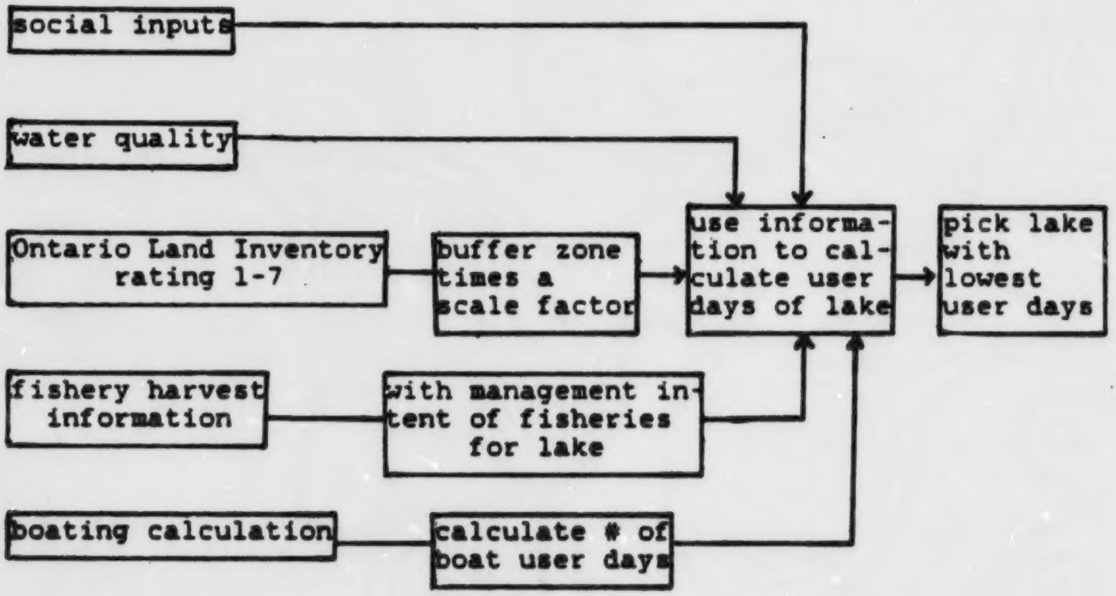
Level C - At the district level, the emphasis is on the operational aspects of achieving the land use plan. All resources and constraints to the environment are taken into account. This district plan is updated and modified to reflect local needs and changes in priority. Methodologies have been developed or are under development to be used at the district level for lake planning, river planning, small lake planning, and residential development. The first three of the above have been completed to date as formal methodologies, while the fourth has yet to be done.

Level D - Specific site plans such as cottage subdivision, town site subdivision, roads and garbage dump sites are developed to meet the requirements laid out within higher level plans. The actual work plans are based on the availability of people, resources and capital.

Figure 10.3.2.3.2-B provides an overview for all of these levels and interrelationships.

These methodologies have been developed by working in the field with the associated data. At this time, Sudbury is a test area for a comprehensive district plan. Currently, methodologies A and B have been developed and accepted while Levels C and D require further refinement.

Components of watershed management include the following subsystems: lake planning, river planning, and small lake planning. By way of example, the planning for cottage site allocation is achieved according to the following procedures.


social inputs
water quality
Ontario Land Inventory rating 1-7
buffer zone times a scale factor
use information to calculate user days of lake
pick lake with lowest user days
fishery harvest information
with management intent of fisheries for lake
boating calculation
calculate # of boat user days

Information is gleaned from a variety of sources from which a number of computations and assessments are made. Specifically, from this example, the number of user days of the lake is calculated and used for planning cottage sites.

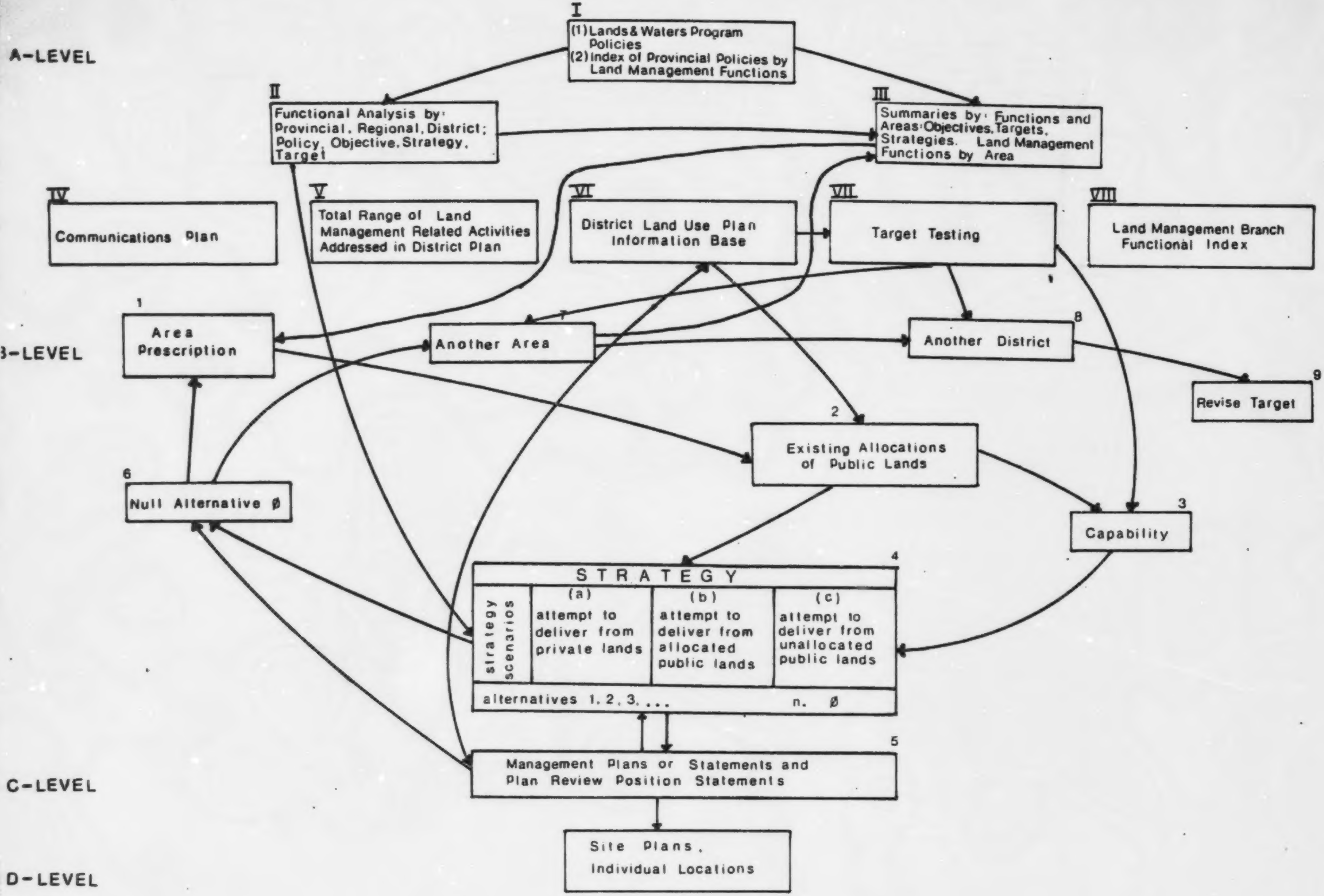
Figure 10.3.2.3.2-A

Area 8 – Nepewassi Lake / Trout Lake

FUNCTION / SUBFUNCTION	PUBLIC LAND AVAILABLE TO MEET TARGET	RESOURCE BASE QUALITY ADEQUATE	STRATEGY	OTHER AGENCIES	WORK PROGRAM ITEMS	OUTPUT MEASURE 'C - LEVEL'
PUBLIC LAND DISPOSITION : COTTAGING - REMOTE	SEVERAL LAKES AVAILABLE IN AREA 3 IDENTIFIED FOR POTENTIAL REMOTE STATUS	[illegible] LAKE 100% CROWN [illegible] LAKE 100% CROWN [illegible] LAKE ([illegible]) 90% CROWN AND SOME ACCESS ONLY LAKES IDENTIFIED FOR REMOTE STATUS	UNDERTAKE LAKE MANAGEMENT PLAN FOR EACH LAKE ROLE OF REMOTE COTTAGING MUST BE THE MAIN ACTIVITY	ALL M.N.R. AGENCIES MIN. MUNICIPAL AFFAIRS + HOUSING [illegible] TOWNSHIPS MIN. ENVIRONMENT	- ASSEMBLE EXISTING DATA AND COLLECT NEW DATA AS REQUIRED BY LAKE PLANNING GUIDELINES - DETERMINE FEASIBILITY OF ESTABLISHING REMOTE COTTAGING ON EACH LAKE - PREPARE MANAGEMENT PLAN - REVIEW ZONING GUIDELINES - INPUT INTO LAKE PLANNING PROCESS	LAKE MANAGEMENT PLAN(S) MANAGEMENT STATEMENT
COMMERCIAL SUMMER RESORTS	75% OF AREA IS CROWN -NO TARGET	SEVERAL EXISTING OPERATIONS -VIABILITY OF NEW OPERATIONS IS [illegible]	APPLICATIONS FOR NEW OR EXPANSION OF EXISTING OPERATIONS WILL BE ASSESSED ON A CASE BY CASE [illegible] BASED ON IMPACTS ON M.N.R. PROGRAMS	ALL M.N.R. AGENCIES MIN. TOURISM + RECREATION M.M.A.H. / [illegible] TOWNSHIPS M.T.C. M.O.E.	- IDENTIFY EXISTING RESORTS - [illegible] LAKE SURVEY [illegible] ONLY AFTER SUBMISSION OF A PROPOSAL - [illegible] LAND MANAGEMENT PLANS [illegible] - [illegible] - REVIEW [illegible] AND [illegible] - REVIEW [illegible] GUIDELINES - REVIEW [illegible] AND [illegible], ETC. - [illegible] LAKE MANAGEMENT PLANNING	MANAGEMENT STATEMENT
AGRICULTURE	75% OF AREA IS CROWN -NO TARGET	LIMITED CLASS I, II, III AVAILABLE - SCATTERED - NOT [illegible] AS [illegible] TO [illegible] TARGET	APPLICATIONS FOR ADDITIONAL LAND FOR EXISTING FARMS ONLY WILL BE CONSIDERED	FOREST MANAGEMENT FISH + WILDLIFE MIN. AGRICULTURE + FOOD	- IDENTIFY EXISTING FARM OPERATIONS - DEVELOP MANAGEMENT STATEMENT - IDENTIFY CLASS I, II, III AGRICULTURAL LAND - PREPARE MANAGEMENT STATEMENT	MANAGEMENT STATEMENT
RURAL RESIDENTIAL	75% OF AREA IS CROWN - NO TARGET	SOME EXISTING POTENTIAL FOR MORE DEVELOPMENT -SEVERAL COMMUNITIES [illegible] THE AREA	DISPOSE OF LAND FOR RURAL RESIDENTIAL USE BASED UPON THE POLICY AND RECOMMENDATION OF THE MINISTRY OF MUNICIPAL AFFAIRS + HOUSING AGGREGATE EXTRACTION WILL DELAY RURAL RESIDENTIAL DEVELOPMENT IF CRITICAL DEPOSITS ARE FOUND	ALL M.N.R. AGENCIES M.M.A.H. + [illegible] [illegible] TOWNSHIPS	- DEVELOP PLAN INPUT AND REVIEW STATEMENTS - COMPILE INVENTORY OF CRITICAL DEPOSITS AS EACH RESIDENTIAL APPLICATION IS RECEIVED - REVIEW POLICY [illegible] - PREPARE MANAGEMENT STATEMENT	MANAGEMENT STATEMENT
MINING LAND MANAGEMENT : COMMERCIAL AGGREGATE EXTRACTION	75% OF AREA IS CROWN	SOME EXISTING OPERATIONS POTENTIAL FOR MORE	EXISTING OPERATIONS WILL CONTINUE NEW COMMERCIAL DEPOSITS WILL BE [illegible] TO AREA [illegible] RESTORE CLASS I, II, III AGRICULTURAL LAND AFTER EXTRACTION COMPLETED	FOREST MANAGEMENT RESOURCE ACCESS ROADS M.M.A.H. [illegible] TOWNSHIPS OF [illegible] M.T.C. MIN. AGRICULTURE + FOOD	- INVENTORY EXISTING OPERATIONS AND [illegible] - REVIEW ZONING GUIDELINES - IDENTIFY CLASS I, II, III AGRICULTURAL LAND - MAKE INPUT TO APPLICATION REVIEW - [illegible] PLAN	MANAGEMENT STATEMENT / PLAN
NON-COMMERCIAL / BORROW PITS	75% OF AREA IS CROWN	POTENTIAL SITES	ADMINISTER PART [illegible] MINING ACT TO [illegible] SCREENING AND REHABILITATION STANDARDS OF PITS + QUARRIES CONTROL ACT RESTORE CLASS I, II, III AGRICULTURAL LAND AFTER EXTRACTION COMPLETED MAKE INPUT TO FOREST MANAGEMENT AND RESOURCE ACCESS ROADS NEW DEPOSITS USED TO MEET LOCAL DEMAND PREPARE INTERIM MANAGEMENT PLAN	FOREST MANAGEMENT RESOURCE ACCESS ROADS MIN. AGRICULTURE + FOOD INCORPORATED TOWNSHIPS M.M.A.H.	- INVENTORY EXISTING PITS AND SITES - INVENTORY AND [illegible] AGGREGATE DEPOSITS [illegible] TO MEET [illegible] PLANS - [illegible] ALL [illegible] - IDENTIFY CLASS I, II, III AGRICULTURAL LAND - REVIEW ZONING GUIDELINES - PREPARE MANAGEMENT PLAN	MANAGEMENT PLAN
MINING LAND DISPOSITION	75% OF AREA IS CROWN	50% OF AVAILABLE LAND IS CLASSIFIED MEDIUM MINERAL POTENTIAL.	ALL PUBLIC LANDS WILL REMAIN OPEN FOR STAKING UNLESS NEED FOR WITHDRAWALS ARE IDENTIFIED IN AN APPROVED MANAGEMENT STATEMENT OR MANAGEMENT PLAN	FOREST MANAGEMENT CROWN LAND RECREATION INCORPORATED TOWNSHIPS MINING LANDS SECTION	- DEVELOP PLAN INPUT AND REVIEW STATEMENTS - ADVISE ALL AGENCIES - REVIEW ZONING GUIDELINES - ADVISE ON WITHDRAWALS - PREPARE MANAGEMENT STATEMENT	MANAGEMENT STATEMENT
RESOURCE ACCESS ROADS	75% OF AREA IS CROWN -NO TARGET	TERRAIN PRESENTS GOOD ROAD CHOICES	IN REVIEW OF THE DISTRICT ROADS STRATEGY, PROVIDE AN INTERIM MANAGEMENT PLAN FOR A PRE-DETERMINED TIME PERIOD	ALL M.N.R. AGENCIES INCORPORATED TOWNSHIPS M.T.C. [illegible] [illegible]	- INVENTORY EXISTING ROADS - [illegible] ROAD [illegible] IDENTIFIED IN EXISTING PLANS - IDENTIFY [illegible] AND [illegible] REQUIRED - [illegible] PROPOSALS TO [illegible] - REVIEW ZONING REGULATIONS - REVIEW AND [illegible] ROAD [illegible] AND [illegible] - IDENTIFY [illegible] - PREPARE MANAGEMENT PLAN	(INTERIM) MANAGEMENT PLAN

LAND MANAGEMENT SYSTEM - LINKAGES

Figure 10.3.2.3.2-B


A-LEVEL
B-LEVEL
C-LEVEL
D-LEVEL
I
(1) Lands & Waters Program Policies
(2) Index of Provincial Policies by Land Management Functions
II
Functional Analysis by: Provincial, Regional, District; Policy, Objective, Strategy, Target
III
Summaries by: Functions and Areas: Objectives, Targets, Strategies. Land Management Functions by Area
IV
Communications Plan
V
Total Range of Land Management Related Activities Addressed in District Plan
VI
District Land Use Plan Information Base
VII
Target Testing
VIII
Land Management Branch Functional Index
1
Area Prescription
7
Another Area
8
Another District
9
Revise Target
2
Existing Allocations of Public Lands
6
Null Alternative Ø
3
Capability
4
STRATEGY
strategy scenarios
(a) attempt to deliver from private lands
(b) attempt to deliver from allocated public lands
(c) attempt to deliver from unallocated public lands
alternatives 1, 2, 3, ... n. Ø
5
Management Plans or Statements and Plan Review Position Statements
Site Plans, Individual Locations

This system is a manual system without digital components. The data base consists of a collection of reports, documents and information sources that have been built up over a number of years. All of these are embodied in the land management system documents.

Every part of this land management system, as exemplified in the Land Management Plan Draft 2, is uniquely identified. The linkages have been established and can be represented diagrammatically. These relationships/dependencies are now on the computer system (Apple). This computer model identifies the relationships between components in order to establish the raison d'etre of the parts of the plans, e.g., the reason for the construction of an access road may not be apparent at the site level, however, this can be discerned from the other parts of the plan at the regional or provincial level.

2. Policy Formulation

Even though the principal emphasis of this Unit has been on developing methodologies, there is another function that is performed which involves identifying sources of information to be used in planning studies and policy formulation. Existing source indices are used wherever possible; however, these do not always provide adequate information. In such cases, access to personal contacts can be used to ferret out information.

The primary functions at the provincial level is to develop a methodology for planning at each of the four levels (provincial, regional, district and site). To facilitate this, they have developed a variety of modelling procedures, e.g., river studies, lake studies, etc. Test studies are conducted to validate these methodologies such as the lake planning model for Rosamond Lake.

The actual data for planning is the responsibility of the district. The manual land use plan is prepared by a resource manager at the regional level with all priorities being set at the district level. Data is not generated but used throughout all the levels of the model as defined by this methodology.

Constraints are used to develop the land use plan and then the model is enhanced to effect a compromise between available resources and requirements. This process may involve several iterations between the province, district, region and associated agencies.

A variety of major data sources are used in most planning exercises. These include:

OLI (Ontario Land Inventory)
CLI (Canada Land Inventory)
FRI base maps
timber resources information
land use records
drainage basin information
air photos

OBM
archaeological site information
fisheries data

These data sources may be augmented by information derived from other areas including other agencies and municipal sources. See data forms for more information.

OBSERVATIONS

A variety of constraints limit this Unit's capabilities. For instance, this Unit has no on-line access to land records data. This requires that in order to retrieve a specific piece of information, a batch run must be created which is both costly and time-consuming. Also, no known index of information sources exists. Much of this type of information is based on intuitive working knowledge.

A great deal of the analysis that is done is of a qualitative nature and requires interpretation. This would require careful consideration and design before computerization may take place.

Not all data sources are current and accurate. Also, a variety of reference base maps are used; therefore, intuitive interpolation which must be done on this data becomes a difficult and time-consuming effort.

There are limited financial resources, hence limiting the potential of this Unit. Greater manpower resources appear to be needed considering the scope and magnitude of the tasks of this Unit.

FUTURE NEEDS AND WANTS

Several needs and wants were identified by the Lake Planning Unit which would facilitate its planning function. A common base, such as the OBM base, would be useful for superimposing watershed windows and drainage networks. Spatial data processing capabilities, such as polygon overlay would be of immense value in an automated mode for digital processing requirements.

A range of other capabilities are also desired by the Lake Planning Unit. Graphic products are needed, since most of the work in this area is related to spatial analysis. Enhanced data interpretation capabilities, tools and techniques are required to interpret the data. A data dictionary would be useful for providing a centralized index to all data sources. Resources such as these are anticipated to increase capabilities and improve the planning process.

Better access to information is required in order to more successfully fulfill the mandate of this Unit. A generalized georeferencing capability would respond to this need.

G.I.S. POTENTIAL

The Unit would benefit from a comprehensive digital data base associated with query capability and display hardware. Within planning, this data base could provide a good decision support system. Some of the G.I.S. data management procedures which would be useful to this Unit include: polygon overlay to determine potential development areas by overlaying soils, vegetation and other data, buffering around lakes, area/perimeter calculations to determine the size of potential development areas, and watershed analysis.

DATA SOURCE INFORMATION SHEET

TITLE: LAKE PLANNING

SOURCE AGENCY: LAKE PLANNING UNIT

PERSON: NORM GORDON

TITLE:

ADDRESS:

PHONE: 5-2742

DESCRIPTION: SYSTEM METHODOLOGY DOCUMENTS e.g. LAKE PLANNING, RIVER PLANNING

FORMAT:

	M	A	MEDIA
MAP	X		AIRPHOTOS, WHITE
TABULAR	X		DOCUMENTS
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: QUALITATIVE INFORMATION

SIZE/VOLUME: N/A

GROWTH RATE:

DATA ITEMS: QUANTITATIVE & QUALITATIVE INFORMATION FROM A VARIETY OF DATA SOURCES

RETRIEVAL KEY(S): N/A

GEOCODE: TOWNSHIP

DATA OF CREATION: N/A

FREQUENCY OF UPDATE: AS REQUIRED

COVERAGE/COMPLETENESS: ONTARIO

SOURCE OF INFORMATION: CLI, OLI, FRI, TIMBER RESOURCES, LAND USE RECORDS, WATERSHEDS, AIR PHOTOS, OBM, ARCHEOLOGICAL SITE, FISHERIES

USERS OF INFORMATION: REGIONS, DISTRICTS AND MUNICIPALITIES

VOLUME/FREQUENCY OF USE: AS NEEDED FOR PLANNING

ACCESS METHOD FOR USER: REPORT

AVAILABILITY: GENERAL

CHARGES: NONE

HARDWARE AND LOCATION: N/A

SOFTWARE: N/A

PROBLEMS:
- PROBLEMS IN DEALING WITH QUALITATIVE DATA
- IDENTIFYING DATA SOURCES
- INABILITY TO CORRELATE DATA SOURCES OF VARYING QUALITY

NOTES:

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: LAKE PLANNING UNIT
(GENERAL SYSTEM METHODOLOGY DEVELOPMENT)

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
◉ AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	CODO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Develop & Validate Methodology	◉	◉	◉	◉	◉	◉		◉							
2	Policy Formulation	◉							◉							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Develop & Validate Methodology	◉					◉	◉				◉			
2	Policy Formulation														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Develop & Validate Methodology									◉				◉	◉
2	Policy Formulation														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA										IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		DISPLAY																						
		COMPOSITION					PRESENTATION																	
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Develop & Validate Methodology						◉		◉		◉										◉	◉	◉	
2	Policy Formulation														◉	◉	◉	◉						

10.3.2.3.3 INTERIM PROPERTY MANAGEMENT UNIT

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Interim Property Management Program is to record the status of lands during the time between the acquisition of the property by the Crown and when responsibility for management passes to the appropriate user group (a district, region or ministry). This Unit also maintains an inventory of these lands. The inventory provides a means of managing the acquired land resource from acquisition through its transition to final use. A staff of one maintains this inventory.

TASKS/SYSTEMS

1. Maintain Acquired Land Inventory

The Land Management Unit receives information on parcels requested for acquisition from the district offices. The Land Management Branch applies this information to a formatted form which includes: attributes of the acquired land relevant to this program, such as district code, lot and concession, township and county, owner, cost, etc. (see the **Appendix** for data entry forms). Government Services inputs the data into the Queen's Park IBM mainframe via formatted screens.

2. Produce Reports

A standard report is generated which lists acquired lands and associated attributes. The report is distributed to the district offices for internal use only. Because the information is of a highly confidential nature, distribution is limited.

OBSERVATIONS

The Land Acquisition Program has been decreased, and all acquisition of land is now by priority. The data base will not diminish significantly due to the constant updating which is required.

FUTURE NEEDS AND WANTS

The Interim Property Management Program has no future needs for fulfilling its responsibilities since the current automated system maintains all necessary information.

G.I.S. POTENTIAL

Since the current E.D.P. system meets all existing needs which have been identified, a G.I.S. system would not be of great benefit to this Unit.

DATA SOURCE INFORMATION SHEET

TITLE: Interim Property Management Program

SOURCE AGENCY: Land Mgt. Br., Public Lands Section

PERSON: Lloyd Hall

TITLE: Interim Property Manager

ADDRESS: Whitney Block
Queen's Park

PHONE: 965-2899

DESCRIPTION: listing of private land that has been acquisitioned by the public

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	Disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: As per Land Registry Records

SIZE/VOLUME: 4,800 records of acquired lands

GROWTH RATE: Decreasing; acquisition program being phased out.

DATA ITEMS: District code, proposal #, property number, transaction type, property description (lot, concession or lot and plan number), township or base map number, county or judicial district, parcel number, status, date of status, area, estimated cost, total water frontage, special water frontage, owners, expenditure charge, comments.

RETRIEVAL KEY(S): Parcel Number

GEOCODE: District code
County

DATA OF CREATION: 1982

FREQUENCY OF UPDATE: as required

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Regional offices

USERS OF INFORMATION: districts, regions

VOLUME/FREQUENCY OF USE: Reports produced monthly.
History update annually; on demand as required to specific purposes

ACCESS METHOD FOR USER: By report generator

AVAILABILITY: Limited

CHARGES: N/A

HARDWARE AND LOCATION: MGS Mainframe, Queen's Park

SOFTWARE: Std. report generator

PROBLEMS:

NOTES: This is a standard inventory management system

GEOGRAPHIC DATA MANAGMENT PROCEDURES

TITLE: Interim Property Management Program

	TABULAR DATA							
AGENCY FUNCTIONS	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
Maintain Acquired Land		●	●	●				●
Inventory								

	CARTOGRAPHIC DATA																				
	GENERATION							MANIPULATION / ANALYSIS													
								GEOMETRIC ANALYSIS													
AGENCY FUNCTIONS	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
Maintain Acquired Land																					
Inventory																					

	CARTOGRAPHIC DATA																							
	MANIPULATION / ANALYSIS														DISPLAY									
	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION				
AGENCY FUNCTIONS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
Maintain Acquired Land																								
Inventory																								

	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
AGENCY FUNCTIONS	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
Maintain Acquired Land													
Inventory													-receive maps as appropriate
													from surveying section for
													visual correlation.

10.3.2.4 TITLES SECTION

10.3.2.4.1 ACREAGE TAX ADMINISTRATION UNIT

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of this Unit is to administer the acreage tax collection for mineral rights on patented mining lands, and to collect rent on both mining leases and licences of occupation. The secondary responsibility of this Unit is to prepare and register forfeitures on mining leases and mining land patents when necessary, or to cancel mining licences of occupation. A staff of 1-1/2 perform these tasks.

TASKS/SYSTEMS

1. Maintain Mining Land Licences and Inventories

The Acreage Tax Unit receives information on mining rights, leases and licences of occupation from the Documents Unit of the Titles Section in the Ministry of Natural Resources. This information includes the following:

a) Mineral rights on patented land, including:
   - a description of the claim by township, lot, concession, township and metes and bounds description
   - name and address of patentee
   - date
   - relevant tax information, including account number
   - see the Appendix for a copy of the mineral rights file

b) mining leases, including:
   - lease and former lease number
   - accounting information
   - claim and parcel number
   - township, lot and concession
   - see the Appendix for a copy of a mining lease

c) Mining Licences of Occupation, including:
   - account number of licence
   - account information
   - location by township and district
   - file number
   - mining claim number, lot and concession
   - see the Appendix for a copy of a mining licence of occupation

The Unit enters this information on cards which are maintained in a card index in three registers: the acreage tax roll; the lease roll; and the licence of occupation roll.

The accounting information is sent to the Accounting Section of the

Ministry of Natural Resources where it is entered into an automated file. The Accounting Section is responsible for billing and collecting the taxes and rents.

The Acreage Tax Unit handles numerous counter inquiries per day from citizens and other ministries interested in mining claim forfeitures, taxes owing, and so on. The Unit also monitors expiry dates on leases. Failure to pay rental or acreage taxes results in proceedings for cancellation of leases and licences of occupation, and forfeitures on patented lands.

G-Plans are used to identify and locate mining parcels for graphic reference purposes. G-Plans, at a scale of 1 inch to 40 chains, are part of a Land Index Series showing mining land information. Included on the G-Plans are plots of patent and Crown lands, leases, roads, railways, shorelines and powerlines. The G-Plan also labels the three categories of tenure: mining rights only, surface right only, and mining and surface rights. The G-Plans are available through the Land Management Branch of the Ministry of Natural Resources.

OBSERVATIONS

In light of the relevance and importance of this Unit's tasks, the unit is moving towards an automated system on a personal computer for maintaining its inventories. This system should provide more efficient access to the information. The hardware has been purchased and data is currently being entered into the system. However, software problems have not been resolved.

FUTURE NEEDS AND WANTS

The Acreage Tax Unit feels that the installation of the automated system will meet all the needs required to fulfill its mandate. In particular, it is felt that efficient retrieval of accurate information is required to handle counter inquiries and monitor expiry dates of leases and licence of occupation for forfeiture or cancellation.

G.I.S. POTENTIAL

Since the Acreage Tax Unit feels its needs will be met by the system currently being set up, a land-related information system would not be of particular benefit in maintaining the three registers within this Section. A global G.I.S. system for Ontario would, however, make this information available to other users.

DATA SOURCE INFORMATION SHEET

TITLE: Acreage Tax

SOURCE AGENCY: Titles Section
PERSON: Gary Sherman
TITLE: Acting Supervisor
ADDRESS: Whitney Block
Queen's Park
Toronto, Ontario

PHONE: (416) 965-1319

DESCRIPTION: inventory of acreage tax

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	X		card index
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: 40,000

GROWTH RATE: -200 to -300

DATA ITEMS: description of claim (lot, township, metes and bounds), district, patentee, date of patent, area, reference number, annual tax, account number

RETRIEVAL KEY(S): district, parcel description

GEOCODE: district, township, concession, lot

DATE OF CREATION: early 1900's

FREQUENCY OF UPDATE: as required

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Document Unit of Titles Section
Land Registry Offices, MCCR

USERS OF INFORMATION: public, internal
other Ministries

VOLUME/FREQUENCY OF USE: several inquiries a day

ACCESS METHOD FOR USER: counter inquiries

AVAILABILITY: open

CHARGES: reproduction cost

HARDWARE AND LOCATION: file indexes
Whitney Block

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: Mining Licences of Occupation

SOURCE AGENCY: Titles Section

PERSON: Gary Sherman

TITLE: Acting Supervisor

ADDRESS: Whitney Block
Queen's Park
Toronto, Ontario

PHONE: (416) 965-1319

DESCRIPTION: inventory of mining licences of occupation

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	X		card index
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 3,000 licences of occupation

GROWTH RATE: 0

DATA ITEMS: licence of occupation number, date issued, rent account number, claim number, acreage, rent, township, district, file number list of transfers of interest, any document affecting title

RETRIEVAL KEY(S): licence number

GEOCODE: district, township
claim number

DATE OF CREATION: early 1900's

FREQUENCY OF UPDATE: as required

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Document Unit in the Titles Section

USERS OF INFORMATION: public, internal, other Ministries

VOLUME/FREQUENCY OF USE: several inquiries a day

ACCESS METHOD FOR USER: counter inquiries

AVAILABILITY: open

CHARGES:

HARDWARE AND LOCATION: file indexes
Whitney Block

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: Mining Leases

SOURCE AGENCY: Titles Section
PERSON: Gary Sherman
TITLE: Acting Supervisor
ADDRESS: Whitney Block
Queen's Park
Toronto, Ontario

PHONE: (416) 965-1319

DESCRIPTION: inventory of mining leases

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	X		card index
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 4500 leases

GROWTH RATE: 60 leases annually

DATA ITEMS: lease number, former lease number, expiry date, acreage, rent account number, annual rent, parcel number, claim number, township, district, lessee and transfer of interest, other documents affecting title

RETRIEVAL KEY(S): lease number

GEOCODE: township, district claim number

DATE OF CREATION: early 1900's

FREQUENCY OF UPDATE: as required

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: Document Unit in the Titles Section

USERS OF INFORMATION: public, internal, other Ministries

VOLUME/FREQUENCY OF USE: several inquiries a day

ACCESS METHOD FOR USER: counter inquiries

AVAILABILITY: open

CHARGES: production cost

HARDWARE AND LOCATION: file indexes
Whitney Block

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Acreage Tax

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Maintain mining		○	○	○			○	
	land licences and								
	inventories								

AGENCY FUNCTIONS		CARTOGRAPHIC DATA																				
		GENERATION						STORAGE	MANIPULATION / ANALYSIS													
									GEOMETRIC ANALYSIS													
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Maintain mining																					
	land licences and																					
	inventories																					

AGENCY FUNCTIONS		CARTOGRAPHIC DATA																							
		MANIPULATION / ANALYSIS														DISPLAY									
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION				
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Maintain mining																								
	land licences and																								
	inventories																								

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Maintain mining													
	land licences and													
	inventories													

10.3.2.4.2 LAND RECORDS UNIT (DOMESDAY RECORDS)

ORGANIZATION AND RESPONSIBILITIES

The primary mandate of this Unit is to maintain the Domesday Records, which are inventories of all Crown land dispositions. The Domesday Records provide the initial ownership reference for all severed lands from the Crown and as such are the basis for initial title. Any further dispositions on the land are recorded in the Land Registry Office. This Unit also is responsible for administering lands which are returned to the Crown. The Land Records Unit has a staff of 12 which is currently automating and maintaining the Domesday Records.

TASKS/SYSTEMS

1. Maintain Domesday Records

Specifically, the Land Records Unit's tasks include:

a. data entry of existing Domesday Records (see the Appendix);

b. checking the computer records produced against the original Domesday Records and updating where necessary;

c. checking the updates to the original data;

d. verifying references, which involves checking against the handwritten abstracts available on microfiche (see the Appendix for a copy of a typical abstract);

e. providing a printout of the entire file for a district by township;

f. incorporating all the pertinent survey records and the liber/folios of the Ministry of Government Services (liber/folios are public records listing land ownerships);

g. checking the parcel on the survey records to ascertain if changes are required, and if so, have the changes been effected by drafting services;

h. field checking data;

i. report generation on demand, such as:

    i) disposition by grantee
    ii) disposition by title reference
    iii) disposition by date
    iv) liber/folios (Ministry of Government Services)
    v) survey records information
    vi) yearly review reports for leases

vii) file numbers
viii) a specific program for Lake Erie oil and gas leases

There is little contact with the Land Registry Office in the districts, except to register the initial patents. In the past, registration was left to the grantee; however, this is now done by MNR as required under the Public Lands Act.

The Land Records Section provides reports of all land alienated from the Crown to the Drafting Section. The Drafting Section incorporates this information onto the M or G-Plans. These plans are at a scale of 1" to 40 chains or 1" to 20 chains and include patent and Crown lands, leases, roads, railways, shorelines and powerlines.

Information is requested from the Domesday Files approximately 50 times per day. The main users of this information are the general public and government ministries. Public access to the data is via over-the-counter inquiries at district offices or in the Land Records Unit at Queen's Park.

The data for the automated records is entered through formatted screens and is stored and maintained by a records management package on the Queen's Park Central computer. Access to the data is by means of a report generator which is used to provide a variety of standard reports. This system has been implemented by using standard software components. As such it is easily maintained.

OBSERVATIONS

In the future, it is anticipated that a terminal located in the office would provide on-line access to the data base. This would facilitate response to public inquiries about the data.

FUTURE NEEDS AND WANTS

In conjunction with terminal access, it is conceivable that each region would receive the data in digital format on tape, in addition to the existing manual reports which are now provided on demand.

G.I.S. POTENTIAL

Within a georeferencing context, on-line access to the land records data could be of value for a variety of users including title searches, land availability, etc. As the system is currently being automated, other potential users of this information could obtain access via communications links.

DATA SOURCE INFORMATION SHEET

TITLE: Land Index

SOURCE AGENCY: Land Mgt Branch
Titles Section

PERSON: Vic Prasad

TITLE: Supervisor

ADDRESS: Whitney Block
Room 6501

PHONE: (416)965-1319

DESCRIPTION: Automated Domesday Records

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	On Line Disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: As per survey data and Land Registry

SIZE/VOLUME: Existing: 240,000 records
Final: 500,000 records

GROWTH RATE: 1200 records per year

DATA ITEMS:
Concession/lot, geocode, survey reference number, region, district, township, land registry titles division, MNR plan number, registry office plan number, acreage, title reference number, liber folio, land file number, review year, account number, purpose of grant, type of transaction, reservations (trees, minerals, surface rights).

RETRIEVAL KEY(S): District, Concession, Lot Number

GEOCODE: To be developed
Reference "Computerization of Land Indexes + Geocodes MNR 1977

DATA OF CREATION: Started July 31/78
Completion July 31/84

FREQUENCY OF UPDATE: 65 records every 2 - 3 days

COVERAGE/COMPLETENESS: 50% of Ontario to date

SOURCE OF INFORMATION:
Manual Doomsday Records, and Source Documents for New Patent Lands

USERS OF INFORMATION: Surveys Drafting, Timber Services, Mining, Public

VOLUME/FREQUENCY OF USE: 50 Times a day

ACCESS METHOD FOR USER: Counter queries and Reports

AVAILABILITY: Open

CHARGES: None

HARDWARE AND LOCATION: M.G.S., Computing Services, Queen's Park

SOFTWARE: Standard Report Generator

PROBLEMS:

NOTES: Standard Information Retrieval Facility

GEOGRAPHIC DATA MANAGMENT PROCEDURES

TITLE: LAND INDEX	TABULAR DATA								CARTOGRAPHIC DATA																																												IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS		BIBLIO-GRAPHIC DATA			REFERENCE TO DATA TYPES
									GENERATION							MANIPULATION / ANALYSIS																												DISPLAY																						
																GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
AGENCY FUNCTIONS	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
Maintain Domesday Records	○	●	●	●				●																																																									Use Survey maps for reference

10.3.3 LAND USE CO-ORDINATION BRANCH

ORGANIZATION AND RESPONSIBILITIES

The Land Use Co-ordination Branch is involved with the Ministry's land use planning and environmental assessment functions. The Branch's primary function is in formulating policies for co-ordinating the planning, use and care of the land and water base by the Ministry's resource oriented programs, and directing the Ministry's approach for input and review of those programs of other agencies that affect resources under the Ministry's mandate. In this capacity, the Branch provides an expertise to other groups within the Ministry and advice to other ministries, agencies, municipalities, etc. on MNR resource concerns.

The Land Use Co-ordination Branch is currently undergoing a reorganization which will affect its existing organizational structure. The Branch originally consisted of three sections:

1. The Land Use Planning Section, responsible for the development of policies, procedures, and guidelines by which planning for the use of Crown land and water was undertaken, and which facilitates an integrated approach to the planning and use of other public and private lands consistent with the achievement of Ministry objectives.

2. The Plan, Input and Review Section, providing direction for the monitoring of provincially significant land, using policies and plans of other agencies to ensure consistency with Ministry-approved Crown land use policy and to facilitate consistency with the achievement of Ministry objectives on private land.

3. The Environmental Assessment Unit, concerned with the development of policies, procedures and guidelines which provide general direction to Ministry units in carrying out their responsibilities under the Environmental Assessment Act of 1975.

Under the current reorganization, two units will carry out the responsibilities of this Branch: the Land Use Planning, and Special Projects Units. The number of personnel in this Branch varies, with a permanent staff of seven to thirteen persons, and a temporary staff of four to eight employees.

TASKS/SYSTEMS

1. Develop Land Use Planning Guidelines and Plans

The primary role of this Branch has been to develop land use planning guidelines which are used by the Ministry in developing its own strategic and local land use plans. At present, land use guidelines have been issued for 45 of the Ministry's 47 administrative districts. These are designed to meet the Ministry's anticipated needs for the next twenty years. At the provincial level, the land use planning was done on the basis of Ministry planning regions: Southern Ontario, Northeastern Ontario and Northwestern Ontario.

The strategic land use plans for the three planning regions are described in reports which are subject to periodic revision. The reports are the outcome of a land use methodology which was first developed in 1974. These reports took their initial policy direction from OSLUP. The district land use guideline documents provide three main functions:

1) they act as guidelines for Ministry staff on integrated resource management,

2) they provide direction for the municipalities in terms of the Ministry perspective for the next twenty years, and

3) they provide a means of testing the feasibility of achieving desired resource management targets and reconciling those targets where they conflict.

The planning function at the municipal level is continuing to evolve based upon the new Planning act of 1983. In the past, municipalities took the lead in planning functions, with the province often acting in the capacity of a special interest group. This role of special interest group was assumed by the Branch, which represents the Ministry's perspective on land use planning. This perspective is both for Crown lands and private lands within municipal boundaries. Land use strategies have evolved in conjunction with other ministries; for example, in regard to aggregate resource management, there is an agreement between the Ministry of Agriculture and Food and the Ministry of Natural Resources. The Branch then acts as a special interest group at the municipal level to ensure that MNR land use concerns are taken into consideration for zoning and planning purposes.

2. Respond to Enquiries and Provide Liaison

The services of the Branch include providing advice on demand, and providing consultation to interested parties. Another function of the office is to act in a liaison role in co-ordination with other users of land use planning information. In this capacity, the Director of the Land Use Co-ordination Branch is also a member of the Land Use Committee of the Cabinet Committee of Resource Development. Other members of this Committee include staff from the Ministry of Transportation and Communications, Ministry of Municipal Affairs and Housing, Ministry of Northern Affairs, Ministry of Treasury and Economics, and so forth.

Since 1974, a land use planning methodology has been in place in the Ministry, varying somewhat from region to region. In Northwestern Ontario, there are three distinct stages in the Ministry's land use planning process. In stage one, existing background data is compiled and sent out as a published document which is in the public domain. Since this was the first attempt in creating many Ministry policies, it required a great deal of feedback from the public and the Ministry, taking place in stage two. In stage three, a draft plan was prepared. The final plan documents preliminary direction on land use planning, which are again subject to updates and revisions by the Ministry.

In this process, the Branch provides both input and guidance at the planning level, with co-ordination at the policy level.

OBSERVATIONS

The Branch does not collect data, but instead relies upon existing data collected in the field. The Branch does, however, have a good understanding of where data is located, and provides this information to interested parties. The major responsibility for data collection rests with the field organizations. There is very limited use of maps by the Branch.

Many of the problems of the past existed due to a lack of definitive provincial policies. The Ministry's district land use guidelines are designed to assist the municipalities by providing specific guidelines in terms of MNR policies for land use.

FUTURE NEEDS AND WANTS

In the view of this Branch, important problems to be addressed for land use co-ordination are in the areas of:

1) establishing a workable set of standards for data collection, and
2) co-ordinating data management activities.

G.I.S. POTENTIAL

There is considerable potential for a G.I.S. within the scope of this Branch. However, this capability is more meaningful for the field offices which actually carry out the planning functions within the Branch. There is perhaps some limited potential for a G.I.S. system in policy formulation, specifically, in examining various land use scenarios through modelling. Tabular and graphic data management procedures would be desirable for this Branch's activities.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: MNR Land Use Co-ordination

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Develop Land Use Planning Guidelines and Plans	◐					◐	◐	◐							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Develop Land Use Planning Guidelines and Plans	◐					◐	◐		◐	◐	◐			◐

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Develop Land Use Planning Guidelines and Plans													◐	◐

AGENCY FUNCTIONS		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Develop Land Use Planning Guidelines and Plans	◐				◐	◐				◐

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Develop Land Use Planning Guidelines and Plans													

10.3.4 SURVEYS AND MAPPING BRANCH

10.3.4.1 DRAFTING SERVICES SECTION

ORGANIZATION AND RESPONSIBILITIES

The Drafting Services Section is responsible for providing drafting services to the Ministry of Natural Resources. In particular, the Drafting Section serves the following client-groups: Lands and Waters, Outdoor Recreation, Forest Resources, Mineral Resources, Administration Division, and completes other specialized drafting services for a variety of clients.

In order to fulfill these responsibilities the Drafting Section has a staff complement of 39.

TASKS/SYSTEMS

1. Provide Drafting Services for MNR

In providing drafting services for MNR, this Section prepares a variety of plans, maps and specialized graphics, each of which is described below.

a. M, T, and G-Plans

M-Plans are used to identify and locate mining parcels for reference purposes. M-Plans at a scale of 1 inch to 40 chains are part of a land index series and show mining land information. Included on the M-Plans are patents, leases, and road, railway, shoreline and powerline rights of way. The M-Plan also delineates three categories: mining rights only, surface rights only and mining and surface rights. M-Plans were originally drafted by the Department of Mines for internal use and for sale to the public.

T-Plans are similar in nature to the M-Plans. Originally, T-Plans were drafted by the Department of Lands and Forests. The significant difference between the two types of plans is that the M-Plans contain surveyed mining claims whereas the T-Plans do not.

There are also two types of G-Plans in development. The first of these involves taking M and T-Plans and combining them to form the new interim G-Plans. The concept for G-Plans was created in 1979, when each region and district was asked to determine whether the M or T-Plan would best represent its area. Once the decision had been made, the M or T-Plan for a particular area would be transferred to an interim G-Plan.

The Drafting Services Section stores the original inkline base of these M and G-Plans. Any revisions or updates are completed using these base plans and duplicates held by the Survey Records Section. The plans are available through the Survey Records Section. Currently, 75% to 80% of the interim area G-Plans for the Province of Ontario have been completed.

In order to update the G-Plans, the Drafting Services Section receives land ownership information from the Public Lands Unit in the Land Management Branch, Survey Records and Regional Mining Recorders.

b. Forest Stand Maps

The Forest Resources Inventory Unit of the Forest Resources Group compiles timber typing, including area, age, height and stocking information, and traces information on FRI or township workmaps. These workmaps are then sent to the Drafting Services Section for longitude drafting onto the FRI base maps. The FRI base maps are produced on a 15 min. by 7.5 min. latitude at the scale of 1:15 840, and show basic topography, culture and land ownership, with forestry polygons overlaid on the topographic and cultural data. Where townships exist, the base maps are drafted on a township basis.

The Drafting Services Section executes the photo interpretation for topographic and cultural revisions of the FRI base map as well as composite forest management unit maps based at 1:50 000. These are distributed to the districts as an overview reference map.

c. Preliminary Geology Maps

The Ontario Geological Survey (OGS) Section requests drafting services on the basis of geologic projects. OGS requests that the Cartography Section develop a map base. The map base is usually compiled from FRI or NTS base maps. Copies of this map are sent to the field geologist.

In the field, the geologist superimposes geology, mineral occurrence, mining claim and property data. The map is then sent to the Scientific Review Section which adds the necessary surround information.

The Drafting Services Section then prepares the preliminary geologic map. After receiving feedback from the public and other geologists regarding the information on the preliminary geologic map, the maps go back to the Scientific Review Section to incorporate changes. The Cartography Section then prepares a coloured geologic map, which is available through the Public Services Centre. These maps are available at a variety of scales, including 1" to 1,000 foot, 1" to 2 miles, 1" to 1/4 mile, 1" to 1/2 mile, 1" to 1 mile as well as a 1:50 000 overview synoptic sheet.

2. Provincial Park Plans

The Outdoor Recreation Group receives sketches and pertinent documentation on the provincial parks from the Regional Provincial Park Co-ordinator. This information is turned over to the Survey Section which prepares, if necessary, a metes and bounds description of that particular park. These descriptions and/or sketches are then sent to the Drafting Services Section where plans are prepared on the best and most suitable available base. For example, some OBM map bases have been used, as well as FRI mosaics. The maps are drafted at a variety of scales depending on the size and complexity of the park. The provincial park plans include topographic and cultural information, such as facilities and roads located within the park.

3. Lake Resource Inventory Plans

At the request of the Outdoor Recreation Group, the Drafting Services Section drafts plans with lake bottom contouring. The Outdoor Recreation Group supplies the Drafting Section with information on fish species and a survey of the lake. These plans are drafted at a variety of scales depending on the size of the lake, and are stored in the Drafting Services Section.

4. Water Lot Plans

On request from the Survey Records Section, the Drafting Services Section drafts water lot plans which are to be registered. These plans show easements, right of ways, and the surrounding water bodies.

5. Land Status Plans

The Drafting Services Section supplies the Cartography Section with information on land that has been alienated from the Crown and Indian Reserves. This information is displayed by the Cartography Section in colour on the 1:100 000 provincial planimetric series maps.

6. Specialized Graphics

The Drafting Services Section also provides drafting services to the Finance Planning and Evaluation Group, administration and other agencies and ministries. These are requests on project bases and are tailored to specific user requirements.

OBSERVATIONS

The Drafting Services Section is limited in its provision of services due to a shortage of staff. Priorities are based on projects for each branch within the Ministry that requires services.

The Drafting Services Section has also experienced some difficulties with the accuracy of township surveys on available base maps, for example, from the FRI series.

Many of the drafting products that this Section stores are being returned to the requesting client-agencies due to a lack of storage space within the Drafting Services Section.

FUTURE NEEDS AND WANTS

The availability of the Ontario base maps for the entire Province of Ontario is necessary in order to develop accurate G-Plans. The G-Plans will be using the OBM as a base for its data. Although it is not mandatory that the OBM information be available digitally, the Drafting Services Section does understand the potential for a digital OBM. In particular, superimposing data, updating data and providing specialized mapping and graphic products to its client-agencies could be made more efficient and effective with the availability of a digital OBM.

Some consideration has been given to automating the in-house drafting in order to expedite the provision of drafting services.

Thought has also been given to linking the Cartography Section on-line to the Drafting Services Section in order for land status information to be more easily accessed by the Cartography Section.

G.I.S. POTENTIAL

The Drafting Services Section would be a central user of any G.I.S. system implemented in the provincial government. This Section provides all of the drafting services for the Ministry of Natural Resources as well as other agencies and ministries within the Ontario Government. By providing its drafting services in digital format and providing an update capability, the Drafting Services Section could complete its tasks in shorter period of time.

A G.I.S. system could also provide on-line information regarding alienated Crown lands to the Drafting Services Section from the Public Lands Section. In this way, the M, T, and G-Plans could be updated automatically.

Some specific G.I.S. data management procedures which would potentially be useful in an automated mode include contouring, spatial and attribute queries, scale change, cosmetic enhancement, graphic superimposition, polygon point and line mapping, and annotation of text.

DATA SOURCE INFORMATION SHEET

TITLE: M , T and G-Plans

SOURCE AGENCY: Drafting Services
PERSON: David Robeson
TITLE: Manager Drafting Services
ADDRESS: Whitney Block
Room 2522
Queen's Park
Toronto, Ontario
PHONE: (416) 965-1823

DESCRIPTION: plans inventorying land disposition, i.e. Crown land and lands alienated from the Crown

FORMAT:

	M	A	MEDIA
MAP	X		
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1" to 40 chains and 1:20,000

ACCURACY/RESOLUTION: drafting accuracy standards

SIZE/VOLUME: 3,800 T-Plans
3,300 M-Plans
100 G-Plans

GROWTH RATE: T and M-Plans declining
G-Plans growing until Province completed

DATA ITEMS: patent lands, Crown lands, leases, roads, railways, shorelines, powerlines, mining rights only, surface rights only and mining and surface rights, township name

RETRIEVAL KEY(S): township or area name

GEOCODE: township, lat./long. for unorganized townships

DATE OF CREATION: early 1900s
G-Plans - 1982

FREQUENCY OF UPDATE: as required by Land Management

COVERAGE/COMPLETENESS: Ontario, wherever lands have been alienated from the Crown and wherever a mining claim has been staked

SOURCE OF INFORMATION:
- Mining Records Office
- Titles Section of Land Management Branch
- Survey Section

USERS OF INFORMATION: extensive use throughout MNR, users in other Ministries, i.e. MOE, public and mining industry

VOLUME/FREQUENCY OF USE: several times daily

ACCESS METHOD FOR USER: purchase from Survey Records Section, through the 9 Mining Recorders Offices

AVAILABILITY: open

CHARGES: $2 per sheet

HARDWARE AND LOCATION: manual files, Whitney Block

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
other maps produced by this Section but not stored on site:
- Forest Stand Maps
- Geology Maps
- Parks Maps
- Water Lot Maps
- Land Status Plans
- Specialized Graphics

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Drafting Services

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Provide drafting									○	◐	◐	◐	◐		◐
	services for MNR															

AGENCY FUNCTIONS		CARTOGRAPHIC DATA																
		MANIPULATION / ANALYSIS																
		GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1	Provide drafting																	
	services for MNR																	

AGENCY FUNCTIONS		CARTOGRAPHIC DATA										
		MANIPULATION / ANALYSIS										
		DIGITAL TERRAIN MODELLING									QUERY	
		SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Provide drafting		◐								◐	◐
	services for MNR											

AGENCY FUNCTIONS		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Provide drafting			◐	◐	◐	◐	◐	◐		◐
	services for MNR										

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Provide drafting			○				○						
	services for MNR													

10.3.4.2 BASIC MAPPING SECTION ONTARIO BASIC MAPPING (OBM)

ORGANIZATION AND RESPONSIBILITIES

The Basic Mapping Section is responsible for providing systematic basic maps for Ontario through the Ontario Basic Mapping (OBM) program. This Section prepares detailed specifications, acts as a contract administrator and oversees the production of mapping materials. This process involves:

1. maintaining a provincial mapping priority system;
2. preparing individual agreement and detailed mapping specifications for each project;
3. assessing mapping proposals, and letting multimillion dollar contracts to the mapping industry;
4. maintaining all stages of production from initial control survey work to final map reproduction;
5. safeguarding all production materials on completion; and
6. providing reproduction materials to other Ministry units for sale of prints, and so forth to the public.

This program has been in operation since approximately 1978, and has an annual budget of \$4 million to \$5 million. The 23 staff members of this Section carry out its responsibilities.

The OBM system was designed as a foundation for a comprehensive geographical referencing system. The system is intended to overcome a variety of existing problems, including the number of different maps that were previously used in the various provincial ministries which were based on different map scales, projections and referencing grids, in addition to being plotted with varying degrees of accuracy.

Although 11 scales have been recommended for use in the province, three in particular will be utilized for the Ontario Basic Mapping program. These are based on the 6° Universal Transverse Mercator Grid System and plotted on normal standard sheet sizes of 50 cm x 50 cm. Maps at a scale of 1:20 000 with 10 metre contours are being produced for all of Northern Ontario, and 1:10 000 scale standard line maps with 5 metre contours are being produced for Southern Ontario. The 1:20 000 scale maps covering the Hudson Bay Lowlands will consist of photo maps, to be produced in the standard map layout incorporating a precise photographic image of the ground and spot heights. The urban areas of the province will eventually be covered with 1:2 000 scale mapping produced in co-operation with local authorities. These maps will have 1 metre contours and one map in each project will show the location of registered parcels of land.

A municipal funding program is available in the form of a starter kit which will partially finance, based on the municipality's population, the production of the 1:2 000 maps for the particular municipality. Specifically, all necessary horizontal and vertical control will be placed on the ground within and surrounding the municipality, the photography will be flown and subsequent bridging of the photos will be carried out. This Section will then assure that 1:2 000 mapping of the municipality's core area is carried out. One map will have an overlay showing the location of registered parcel limits. The production of the other maps in outlying areas will be left for the responsible municipality to complete. Much of the cost of these additional maps will have been paid under the starter kit.

It is estimated that eventually there will be approximately 24,000 OBM maps at a variety of scales covering the whole of Ontario. These maps will generally show planimetric features such as building outlines, street curbs and other man-made features as well as contours, spot heights and natural features.

The approach to map production can be divided generally into two categories:

a. municipalities for large scale maps, and
b. the whole of Ontario at the medium scale of 1:20 000 and 1:10 000.

In 1982, 1,600 maps involving all three scales were produced, and it is estimated that on average 1,000 maps will be produced per year via this program. The level of production will be a function of the funding available.

As of April 1983, the status of the mapping program was as follows:

	Type	Completed	To be Completed
1:20 000	topographic line maps	903	6,590
1:20 000	photo maps	9	2,240
1:10 000	topographic line maps (1745 additional maps at the scale of 1:10 000 have planimetric data plotted but have yet to have contour data plotted)	681	4,010
1:20 000	urban maps	1,063	10,000
1:10 000	derived maps (produced on demand) created by photo	4	
1:5 000	enlargements of 1:20 000 and 1:10 000 maps	64	

The photo enlarged maps have proven popular with the Conservation Authorities for their flood plain mapping programs. An update cycle will soon be incorporated into the program. It is estimated that the urban areas of the maps will be updated approximately every five years, and the rural areas of Ontario may be updated every 30 years.

TASKS/SYSTEMS

1. Administer Production of Municipal Maps

To initiate the large scale 1:2 000 mapping, a municipality must first approach the Ministry. The Basic Mapping Section follows provincial priorities in commencing projects. When funding permits, the municipality is asked to appoint an agent (who can be a surveyor or a mapping firm). The agent's first duty is to prepare a mapping proposal for the municipality. On approval by MNR and the municipality, the details are written into an agreement between MNR and the municipality. Preparation of the agreement and actual map production take place over a two-year period. During this time, the Section monitors production.

2. Administer Production of Medium Scale Area Maps of Ontario

The workflow for the mapping of the medium scale 1:10 000 and 1:20 000 maps also follows the provincial priorities. The provincial priorities are established through an interministerial committee made up of a number of provincial government departments. The Basic Mapping Section prepares the necessary specifications and approves contracts to private surveying and mapping firms to actually carry out all the necessary preparatory work as well as the actual mapping. Specifically, for those areas of interest within the blocks, horizontal and vertical control are established on the ground. Subsequently, aerial photographs are taken and stereo compilation is carried out prior to actual mapping or manuscript preparation.

Throughout this process the Section's staff monitors contractor progress, reviews incoming results on a sample basis, and conducts ongoing administrative activities, including invoice processing.

Once all the mapping has been completed, the reproduction materials and final positives are stored in what is known as the Ontario Topographical Record located in the Section's office in Toronto.

Throughout the mapping process, the Basic Mapping Section co-ordinates with a variety of other sections within the Ministry of Natural Resources. In particular, for the checking of any control that has been established on the ground, the Section will liaise with the Geographical Referencing Section of the Surveys and Mapping Branch; for the depiction of township surveys, the Basic Mapping Section co-operates with the Drafting Services Section; and for nomenclature, the Section refers to the Nomenclature Unit.

As a final step, the Cartography Section produces the necessary index maps that are used by the Basic Mapping Section. A copy of the OBM map products are contained in Figures 10.3.4.2-A - 10.3.4.2-E.

The Basic Mapping Section also assists the mapping industry in accurately positioning approved nomenclature on existing 1:50 000 maps.

Figure 10.3.4.2-A

Ministry of
Natural
Resources
Ontario

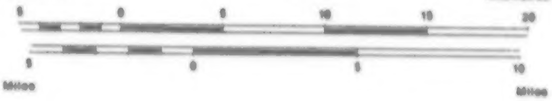
ONTARIO BASE MAPS

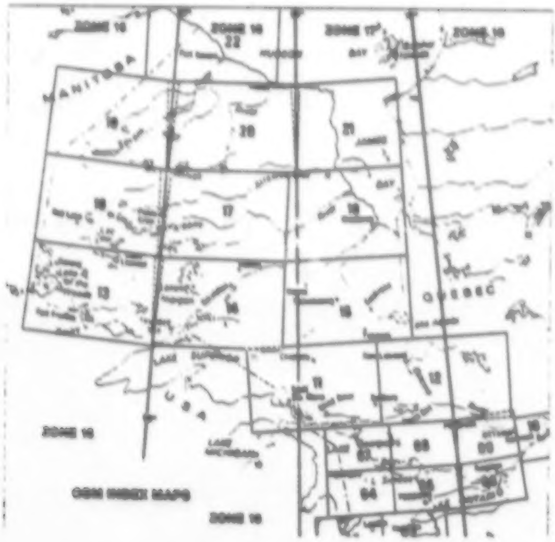
Index map 01, 02

APRIL 1983

UNIVERSAL TRANSVERSE MERCATOR
GRID SYSTEM—ZONE 17

Scale 1:250 000


Kilometres
5
0
5
10
15
20
Kilometres
5
0
5
10
Miles
Miles


ZONE 16
22
ZONE 17
MANITOBA
20
21
17
13
12
QUEBEC
U.S.A.
ZONE 16
OBM INDEX MAPS
64
ZONE 16

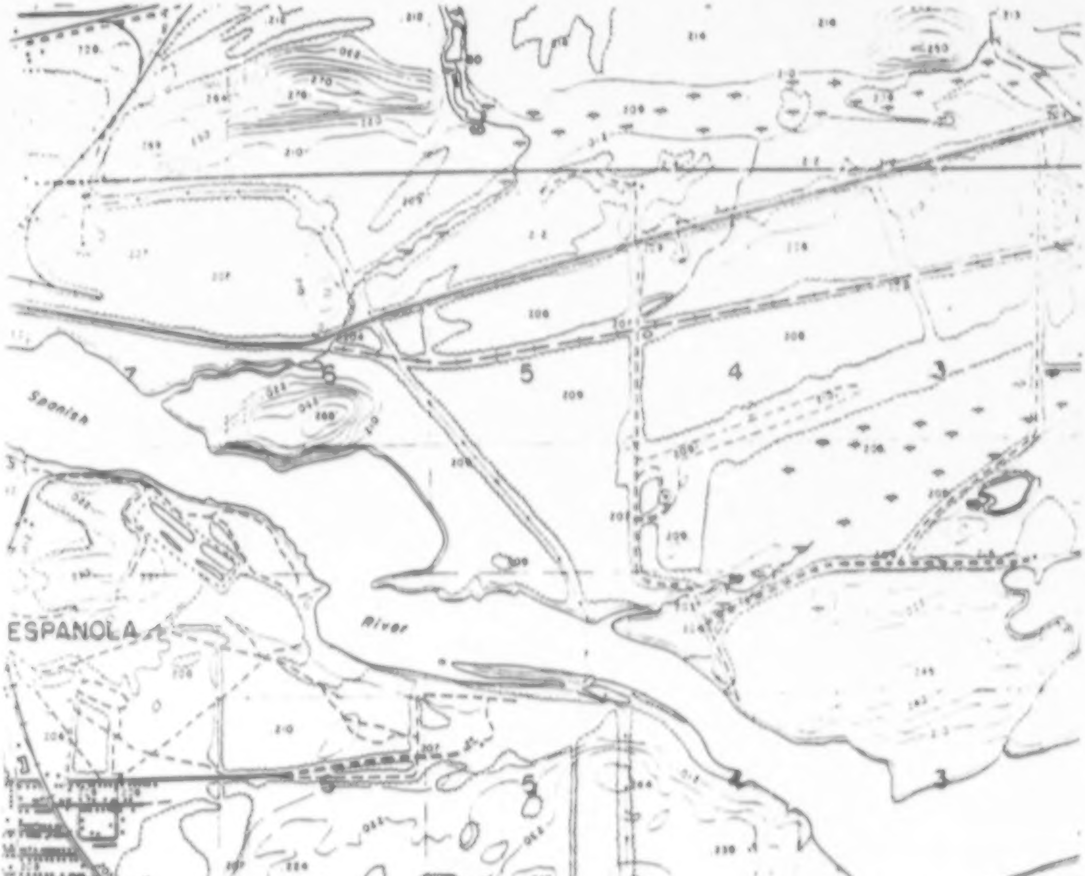

ESPANOLA
Spanish
River
Creek
CPR
Lake
Anderson
Lake
0
20
30
81°44'
40
50

Figure 10.3.4.2-B

Scale 1:20 000

Metres 1000 0

Feet 1000 0 1000 2000 3000 4000 5000 6

4400 51200

rveys and Mapping Branch.
1978 Published 1979

Contour Interval 10 Metres

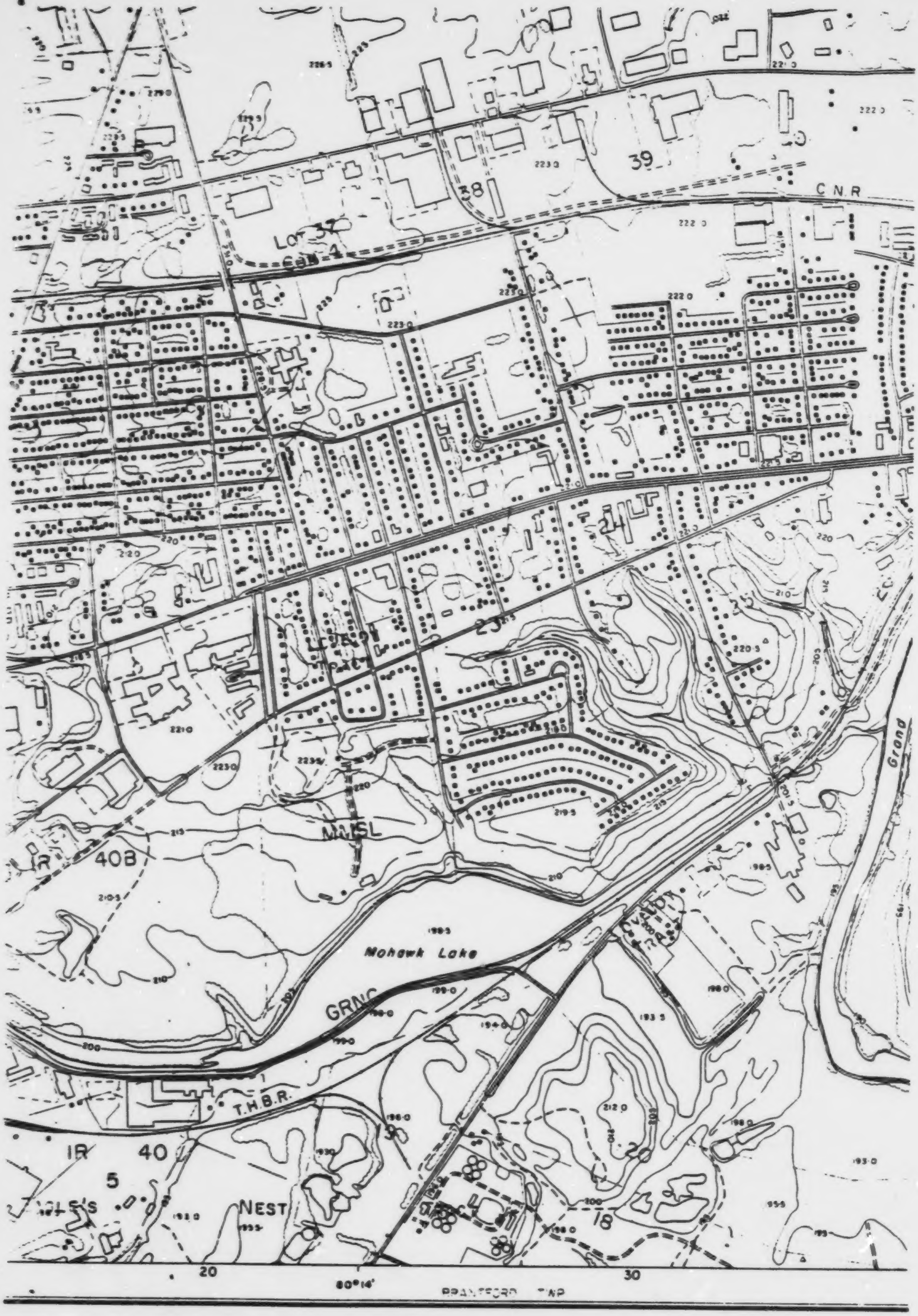
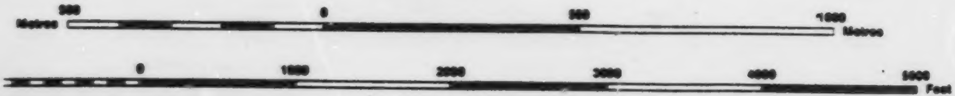

C.N.R
39
38
Lot 32
Con 4
24
23
IR
40B
Mohawk Lake
GRNC
T.H.B.R.
IR
40
5
Eagle's
Nest
20
18
Grand
20
80°14'
30
BRANTFORD TWP

Figure 10.3.4.2-C

Scale 1:10 000


Metres
500
0
500
1000
Metres
0
1000
2000
3000
4000
5000
Feet

Contour Interval 5 Metres

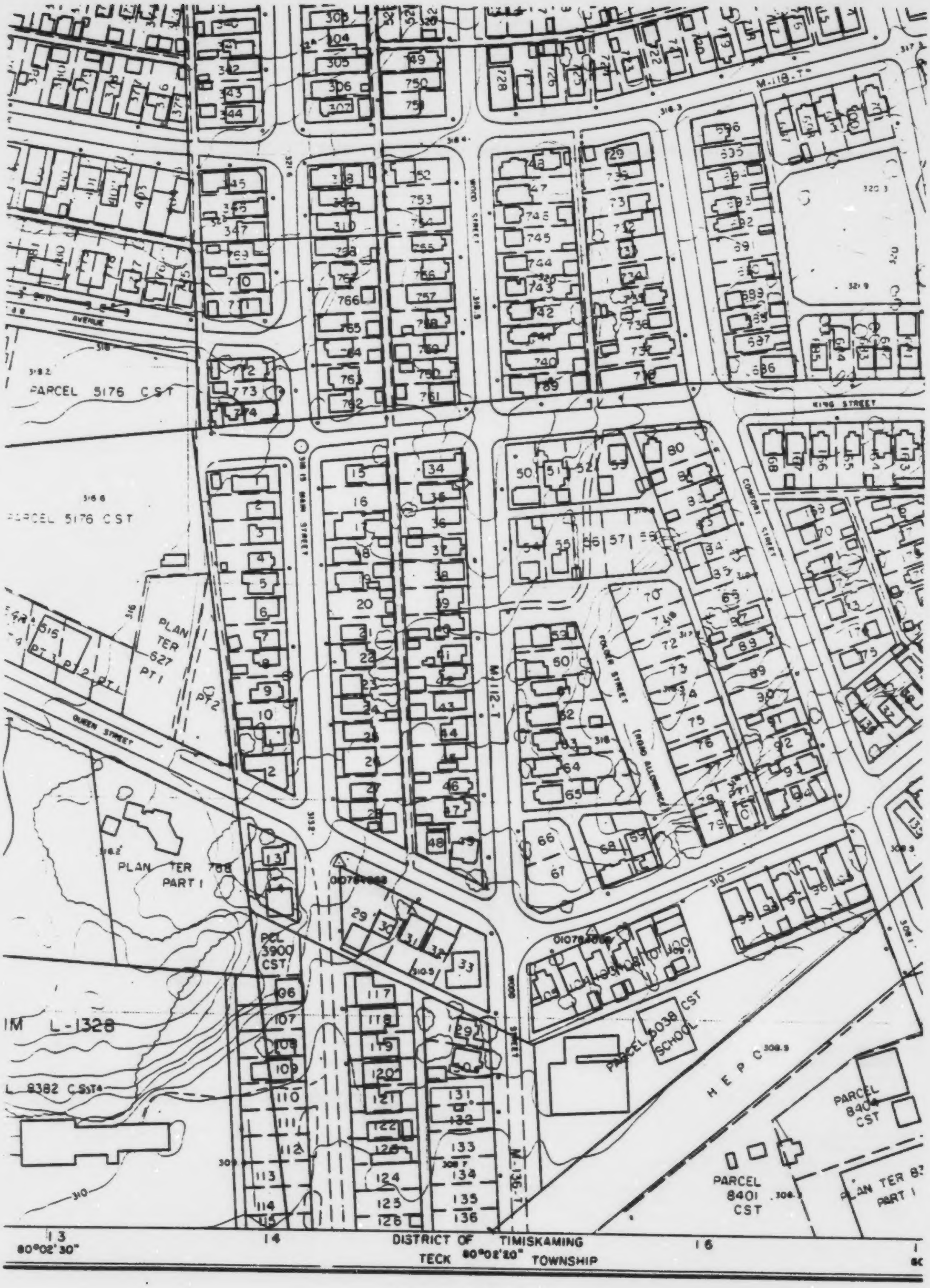
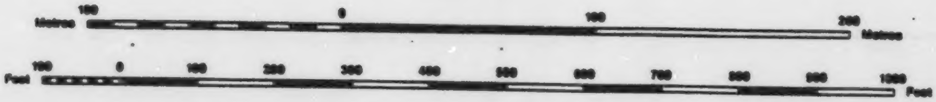

M-118-T
AVENUE
PARCEL 5176 CST
KING STREET
MAIN STREET
WOOD STREET
COMFORT STREET
PARCEL 5176 CST
PLAN TER 627 PT 1
PT 2
QUEEN STREET
M-112-T
PLAN TER 768 PART I
PCL 3900 CST
IM L-1328
L 8382 CST
PARCEL 5038 CST SCHOOL
H E P C
PARCEL 8404 CST
PARCEL 8401 CST
PLAN TER 83 PART I
M-136-T
13
80°02'30"
14
DISTRICT OF TIMISKAMING
TECK 80°02'20" TOWNSHIP
16

Figure 10.3.4.2-D

Scale 1:2 000

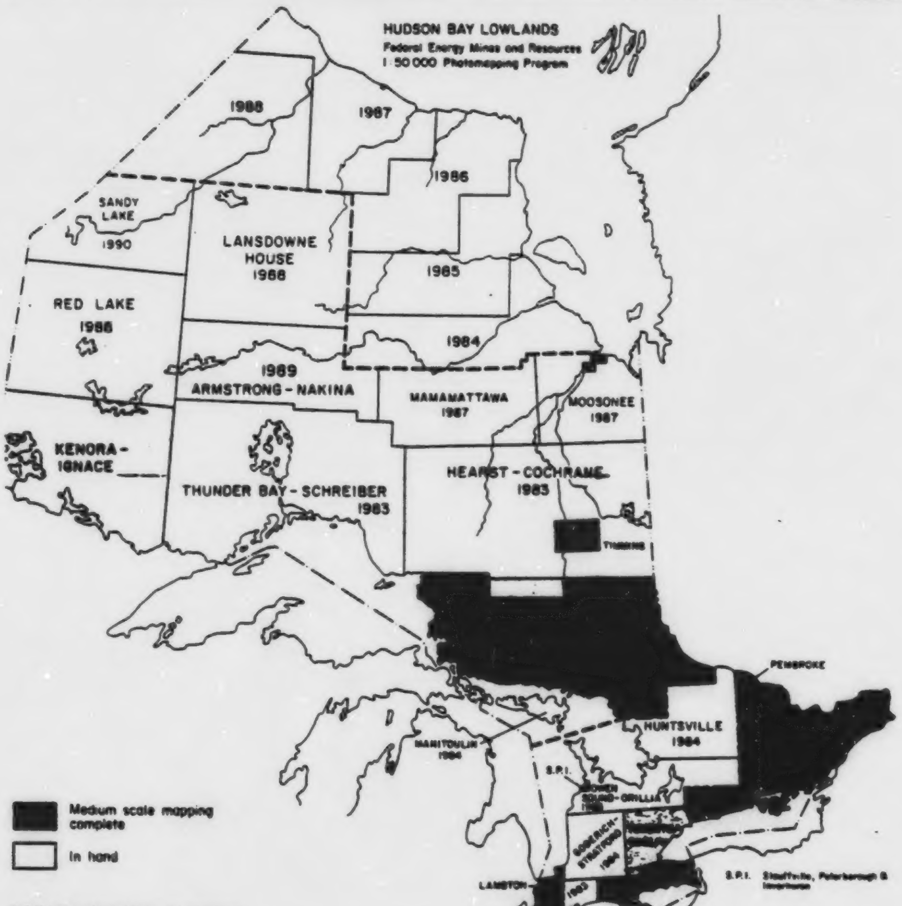

100
Metres
0
100
200
Metres
Feet
100
0
100
200
300
400
500
600
700
800
900
1000
Feet

Contour Interval 1 Metre

Figure 10.3.4.2-E

Mapping Priorities Approved At Standing Priorities Meeting
January 1983 For 1983/84

1983 02 0


HUDSON BAY LOWLANDS
Federal Energy Mines and Resources
1:50 000 Photomapping Program
1988
1987
1986
1985
1984
SANDY LAKE
1990
LANSDOWNE HOUSE
1988
RED LAKE
1986
1989
ARMSTRONG - NAKINA
MAMAMATTAWA
1987
MOOSONEE
1987
KENORA - IGNACE
THUNDER BAY - SCHREIBER
1983
HEARST - COCHRANE
1983
TIMMINS
PEMBROKE
HUNTSVILLE
1984
MANITOULIN
1984
S.P.I.
OWEN SOUND - ORILLIA
GODERICH - STRATFORD
1984
LAMBTON
1983
Medium scale mapping complete
In hand

S.P.I. Stouffville, Peterborough & Haverhurst

Initial map production stages to commence in year indicated in blocks.

Individual map sheets and municipal mapping projects will be produced in the following year.

OBSERVATIONS

One of the problems experienced by this Section concerns the depiction of township fabric on the OBM maps. In the past, the township fabric position was determined using air photo imagery in conjunction with reference to orginal survey notes and township plans. However, it was found that the boundaries as displayed were not of sufficient accuracy. To overcome this, the Section decided to carry out more detailed searches in the various land records to determine with greater accuracy the extent of township boundaries for a particular area. To this end, Drafting Services has provided one of their staff members on loan to the Basic Mapping Section.

Funding for the OBM program originates in the main MNR budgets, although in the past it has also come from a variety of sources, including the Ministries of Northern Affairs and Health.

The Geographical Ref[illegible]encing Section of the Surveys and Mapping Branch has digitized a limite[illegible]mber of OBM maps on a pilot project basis. This was carried out to test the [illegible]ibility of producing digital OBM maps.

FUTURE NEEDS AND WANTS

Probably the greatest problem faced by this Section is the availability of sufficient funding to carry out the mapping program. In recent years this funding has fluctuated, causing the progress of the mapping to fluctuate as well. This Section would obviously benefit from a more stable budget, allowing them to complete this program as soon as possible, and to start the ongoing process of map revision and update.

G.I.S. POTENTIAL

As a common map base for the Province of Ontario, the potential is quite large for its application in a G.I.S. In a digital format its usefulness would be likely to increase, due to the greater capabilities available to the user. The OBM map could be utilized by both municipalities and the provincial government to depict geographically referenced information. In its digital format, the OBM map will provide the medium for readily transferring data among the users.

DATA SOURCE INFORMATION SHEET

TITLE: Ontario Basic Mapping

SOURCE AGENCY: Basic Mapping Section
PERSON: Mr. B. J ackson
TITLE: Manager, Basic Mapping
ADDRESS: Min of Natural Resources
Whitney Block, Rm 2623
Queen's Park
Toronto, ON M7A 1W3
PHONE: (416) 965-1208

DESCRIPTION: a map base consisting of topographic and planimetric information produced at 3 prime scales

FORMAT:

	M	A	MEDIA
MAP	x		mylar
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1:2,000, 1:10,000, 1:20,000

ACCURACY/RESOLUTION: Control - 1/10 of inch
lines - drafting accuracy
contours - one half of contour interval

SIZE/VOLUME:
1:20,000 - 903
*1:10,000 - 681   1:2,000 - 1,063

GROWTH RATE:
1,000 per year

DATA ITEMS: contour - township fabric
- topographic features - planimetric such as roads, buildings and cultural features - approximate parcel limits on some 1:2,000 maps
- water features
- grid and surround
- building fill at 1:20,000 scale

RETRIEVAL KEY(S): map number consisting of:
scale
grid zone number
northing & easting

GEOCODE: UTM eastings and northings

DATE OF CREATION: 1975

FREQUENCY OF UPDATE: approx. every
5 years - urban
30 years - hinterland

COVERAGE/COMPLETENESS:
will be entire Province at a scale of 1:10,000 or 1:20,000

SOURCE OF INFORMATION:
monumented ground control and survey notes

USERS OF INFORMATION:
government agencies,
ministries
municipalities and
general public

VOLUME/FREQUENCY OF USE:
daily

ACCESS METHOD FOR USER:
small scale maps
1:10,000 & 1:20,000 at public services centre at Queen's Park
1:2,000 at municipalities

AVAILABILITY:
map paper prints - open

CHARGES:
$2.00 per sheet (map paper prints)

HARDWARE AND LOCATION:
files MNR
Basic Mapping Section .

SOFTWARE:
N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

*approximately 1,745 maps at the scale of 1:10,000 have planimetric but no contour information plotted as yet

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: OBM Ontario Basic Maps

MNR
Whitney Block
Room 2623
Queen's Park
Toronto, Ontario

LEGEND:
- ○ MANUAL PROCESS
- ● NOW DONE MANUALLY WANT TO AUTOMATE
- ◉ AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

	AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	CODO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Administer, check and maintain maps	◉								◉						◉

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Administer, check and maintain maps														

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Administer, check and maintain maps													◉	

	AGENCY FUNCTIONS	CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Administer, check and maintain maps										

	AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Administer, check and maintain maps	○	○	○	◉	◉	◉	◉						

10.3.4.3 GEOGRAPHICAL REFERENCING SECTION

ORGANIZATION AND RESPONSIBILITIES

The Geographical Referencing Section's prime functions are to develop, implement and promote geographical referencing standards and aids in Ontario. Towards this end, the following efforts are being carried out by a total staff of five:

1) A centralized data bank for horizontal control surveys given the acronym COSINE has been established, in which all data on all provincial horizontal control stations will be recorded. A staff of two maintain COSINE which, in conjunction with the Ministry's control survey analysis and adjustment program, MANOR, will be used to handle the readjustment of all provincial horizontal control surveys, subsequent to the redefinition of the North American Datum in 1985.

2) Research and development are conducted towards the implementation of a digital topographic data base for Ontario.

3) Establishment of precise calibration baselines is under way in major urban areas of Ontario.

4) Examination of control surveys is carried out by private contractors for the Ministry of Natural Resources.

5) General purpose computer programs are being developed or purchased, including: MANOR (Horizontal Control Adjustment and Analysis Program); MACSPLOT (Horizontal Control Plotting Program); DIGITAL MAP OF ONTARIO; and others.

TASKS/SYSTEMS

1. Produce, Maintain and Promote the Use of Digital Topographic Maps

Several tasks and activities are carried out by the Geographical Referencing Section in efforts to produce, maintain and promote the use of digital topographic maps:

a. The staff implements the Universal Transverse Mercator (UTM) Grid System for the province. Its use is promoted through seminars, slide shows and publications on the Ontario Geographical Referencing Program. It also promotes a Grid Cell System structured on the UTM for agencies that use grid cells for data referencing or analysis. The UTM system was officially adopted as the geographical referencing grid for Ontario in 1981.

b. The staff is designing the Ontario Basic Mapping System which involves structuring the map sheet neat lines on the UTM grid, and creating a georeferenced type map numbering system.

c. In conjunction with other provinces and the federal government, the Section has helped in designing a topographic feature classification and coding system for use in Canada.

d. The staff holds seminars and publishes reports to get input from potential users for the development of standards and to disseminate information on geographical referencing activities.

e. The Section reviews the progress of associated technology by reviewing publications, attending seminars, visiting digital mapping installations and vendors of digital mapping and related systems.

f. The Section also prepares specifications and guidelines for horizontal control surveys.

2. Develop and Maintain Provincial Horizontal Control Survey Data Bank COSINE

a. The Georeferencing staff liaises with municipalities and other agencies establishing horizontal control to explain COSINE and how it operates. These agencies are encouraged to store their data in COSINE, and, where necessary, to reformat their data into COSINE compatible format for inclusion in the COSINE data bank.

b. All MNR horizontal control survey data are loaded into COSINE by this Section. In addition, all horizontal control survey data are edited for duplications and co-ordinate conflicts.

c. Enhancement specifications for COSINE are prepared based on both current and future demands of the program.

d. The data base is maintained and administered by regularly backing up data to ensure security. Also, on-line and batch access are provided to users of horizontal control survey data.

3. Establish Precise Calibration Base Lines

a. The Geographical Referencing Section receives requests from municipalities or regional groups of land surveyors for the establishment of a precise calibration base line. Based upon such requests, several of the steps which follow may be undertaken.

b. The site will be visited to check if it conforms to site specifications.

c. Locations of base line pillars will be staked out, and sketches of sites and approximate profile plans will be prepared.

   d. Tenders are let to surveying and engineering firms for the installation of base line pillars, provision of elevations and preliminary measurements between pillars.

   e. Sites are inspected to see if pillars meet required specifications for payment.

   f. The Department of Energy, Mines and Resources, Ottawa, is contacted to arrange for their staff to measure the base line.

   g. The Ministry's base line publication is updated and distributed, and periodic maintenance checks are performed.

   h. Measurements are received from users, then compared and stored.

4. Examine Horizontal Control Surveys

   a. Network designs submitted by private contractors are examined. They are approved or rejected, and, if rejected, suggestions for improvement are made.

   b. Returns of surveys completed for MNR are examined, and examination reports are prepared.

5. Develop or Purchase General Purpose Computer Programs

   a. General purpose computer programs are analysed to determine suitability for geographical referencing purposes.

   b. Specifications for the development of programs suitable to georeferencing needs are prepared.

   c. Locations of base line pillars will be staked out, and sketches of sites and approximate profile plans will be prepared.

   d. Tenders are let to surveying and engineering firms for the installation of base line pillars, provision of elevations and preliminary measurements between pillars.

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5. **Develop or Purchase General Purpose Computer Programs**

   a. General purpose computer programs are analysed to determine suitability for geographical referencing purposes.

   b. Specifications for the development of programs suitable to georeferencing needs are prepared.

   c. Contracts are let and progress is monitored regarding program development. Acceptance testing is also conducted.

OBSERVATIONS

UTM is the provincial standard grid, which was adopted after other systems were established. To date, not everyone is using this grid system in conjunction with their data.

Over 200 showings in 1-1/2 years of a geographical referencing slide show has served as a good communication medium for the Section. It is an informational tool, which successfully responds to the Section's mandate to promote geographical referencing standards and aids.

COSINE does not currently contain vertical control. However, it is expected to add vertical control in the near future.

A digital topographic data base, if in existence, would eliminate the duplication of map making within certain scale ranges. It would simultaneously ensure consistency and representation of features shown on the maps.

All horizontal control adjustments are now carried out on IBM mainframe or on contract. With the increase in the amount of adjustments due to redefinition/readjustment, it appears that an in-house minicomputer could pay for itself many times over in the next three to four years.

FUTURE NEEDS AND WANTS

The Geographical Referencing Section would like the capability to join individually digitized map sheets into a continuous digital map, as well as a capability to integrate subsequently digitized thematic data with the previously digitized base map.

A simple, effective and fast means of capturing line map data in a structured digital format would be useful for the Section's ongoing efforts. Also, the Section would like access to an in-house minicomputer for performing adjustments associated with readjustment, an in-house plotter for plotting horizontal control survey networks and digital graphic products, and a digital topographic data base facility.

G.I.S. POTENTIAL

Geographical Referencing standards which are being recommended will (if adopted) have a major influence in simplifying correlation of information from different geographical information systems.

The provincial horizontal control survey data bank COSINE has the capability to integrated cadastral survey information. This could help expedite the production of digital parcel maps which in turn could form a foundation for municipal land-related information systems. COSINE could also be utilized by anyone dealing with point-related information.

In addition, a digital topographic data base, if properly structured, could be a foundation on which all thematic information normally shown on topographic maps could be referenced and correlated.

In the production and maintenance of digital topographic maps, there are many cartographic generation, geometric and network analysis and digital terrain modelling procedures which would broaden the existing capabilities of the Section. Based upon requests, the Section would like to be able to use map join, address geocoding, vector/cell conversion, proximal analysis, line length calculation, aggregation, distance accumulation, contiguity analysis, various network analysis and digital terrain models, as well as automated point plotting capability.

DATA SOURCE INFORMATION SHEET

TITLE: CONTROL SURVEY DATA

SOURCE AGENCY: Geographic Referencing Section
PERSON: Mr. Z. Jiwani
TITLE: Manager
ADDRESS: Room 3422, Whitney Block
Queen's Park

PHONE: 416 - 965-4538

DESCRIPTION: Horizontal control data consisting of coordinates, survey observations and associated accuracies. Maintained in an automated D/B called COSINE

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	disc
IMAGE			
TEXT			
LIBRARY			

NOTE: N/A

SCALE: N/A

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME:
40 000 stations

GROWTH RATE:
13 000 stations/year

DATA ITEMS:
-latitude & longitude
station number identification
survey observations
standard deviation
related text information and station description

RETRIEVAL KEY(S):
Station ID numbers
geographic areas defined by coordinates

GEOCODE:
latitude and longitude

DATE OF CREATION: 1981

FREQUENCY OF UPDATE:
daily

COVERAGE/COMPLETENESS:
will cover entire province by 1985

SOURCE OF INFORMATION:
control survey agencies in Ontario
(Government and private surveyors)

USERS OF INFORMATION:
-surveyors and engineers in government and private industry and other related government agencies

VOLUME/FREQUENCY OF USE:
daily

ACCESS METHOD FOR USER:
via CRT Terminal at MNR or telephone dial in from remote locations

AVAILABILITY:
open

CHARGES:
cost recovery of computer usage

HARDWARE AND LOCATION:
Queen's Park Computer Centre IBM3033
IBM 3278 Terminals

SOFTWARE:
COSINE Program
FORTRAN AND ASSEMBLER

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
Ministry also has MANOR Program for computation of control survey networks.
- also "Maxplot" program for automated plotting of control survey networks

DATA SOURCE INFORMATION SHEET

TITLE: Geographical Referencing Digital Maps

SOURCE AGENCY: Geographical Referencing Section

PERSON: Mr. Z. Jiwani,

TITLE: Manager

ADDRESS: Room 3422, Whitney Block
Queen's Park

PHONE: 416-965-4538

DESCRIPTION:
R & D for the Development of a digital mapping facility and creation of a digital topographic data base

FORMAT:

	M	A	MEDIA
MAP		xx	disc/tape
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1: 2000, 1:10 000 1:20 000

ACCURACY/RESOLUTION:

SIZE/VOLUME:
17 maps

GROWTH RATE: unknown due to R & D nature of project

DATA ITEMS:
Topographic and cultural features

RETRIEVAL KEY(S):
map number (based on UTM coordinate)

GEOCODE:
UTM coordinates
component of map number

DATE OF CREATION: 1981

FREQUENCY OF UPDATE: R & D unknown

COVERAGE/COMPLETENESS:
Ottawa & Espanola areas

SOURCE OF INFORMATION:
Ontario Basic Maps

USERS OF INFORMATION:
Geographical Referencing Section

VOLUME/FREQUENCY OF USE:
unknown, R & D

ACCESS METHOD FOR USER:
currently inhouse use only

AVAILABILITY:
N/A

CHARGES:
NIL

HARDWARE AND LOCATION:
Pop 11/50 VT100 Terminal,
Textronics 4014, Hard disc drive

SOFTWARE:
Georef Software developed at Guelph

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:
GEOGRAPHICAL REFERENCING SECTION
SURVEYS AND MAPPING BRANCH
MINISTRY OF NATURAL RESOURCES
ROOM 3422 WHITNEY BLOCK
QUEEN'S PARK

LEGEND:
○ MANUAL PROCESS
◉ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA																																													IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
									GENERATION						STORAGE	MANIPULATION / ANALYSIS																												DISPLAY																						
																GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																		
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	CODING	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Producing, Maintaining & Promoting Use of Digital Topographic Maps									●	●	●	●	☐	☐	●	●	☐	●	●	●	●	●	●	☐	☐	●	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	●	●	●	●	●	●	●	●	◉	●	☐	●													
2 Administering and Maintaining Control Survey Data	●	●	●	●	●	●	●	●																																										●	●		●													

10.3.4.4 NOMENCLATURE SECTION

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Nomenclature Section is to provide an inventory of all names of geographic places and features within Ontario. The Nomenclature Section works in conjunction with the Ontario Geographic Names Board (OGNB). The Section also deals very closely with the Federal Toponymic Section within the Department of Energy, Mines and Resources Canada, Surveys and Mapping Branch in Ottawa. There are four people currently working in the Section, which is reduced from a maximum of twelve in the past.

The mandate for maintaining names within the province was derived from a sequence of events starting in 1968. In 1968, the federal government passed to the provinces the mandate for maintaining inventories of all names within the respective provinces. In 1968, the Ontario Geographic Names Board Act was passed and was officially proclaimed in 1969. The Nomenclature Section was created in 1971.

TASKS/SYSTEMS

In carrying out its mandate, the Section performs a number of basic tasks:

1. Providing Geographic Names

The Section is responsible for preparing a list of names for consideration by the Ontario Geographic Names Board. Requests for names of certain features are received by this Section mainly from the public sector and mapping agencies. The names information is derived by phoning, corresponding with and distributing questionnaires to the MNR regions, municipal authorities and local residents. The data is collected primarily for mapping purposes and is in accordance with local usage. Information concerning the establishment of names is presented to the Ontario Geographic Names Board for official approval four times per year. The Board in turn makes recommendations to the Minister for acceptance of official names.

There are, however, a large number of other names which are part of the inventory which are not official. These names are also derived from a number of sources. In some cases, the names are alternate names to the established official names. As well, a variety of names are incorporated in the inventory which are not within the jurisdiction of the Ontario Geographic Names Board. For example, under the Municipal Act a variety of names such as those for regions and municipalities are generated and maintained for reference. Other names are also derived from previous usage, for example, the previous municipalities of Galt, Preston and Hespeler have since been combined into the Municipality of Cambridge. The orginal names are now maintained as community centre names. Another basic function of the Nomenclature Section is to decide how to deal with names in a jurisdictional sense. For example, municipal names are under the jurisdiction of the Municipal Board, and, therefore, are official through the Municipal Act. The use of other names must be researched locally and their usage established before they become official.

The Section must also deal with names which are not legally recognized, for example, subdivision names. Such names which have a commercial connotation are avoided until such time as usage has been established, when they will be incorporated into a proper inventory or index.

2. Maintain Geographic Names Inventory

The Section maintains a manual card index for each name in the province. Recorded on each card is the following information: name, status of name, entity (for example, physical features such as lake or river, etc.), recommending authority and date, serial number (which accesses a key), location (in terms of geographical co-ordinates for the centroid where applicable or in terms of degrees, minutes and seconds) and information with regard to the NTS map sheet number or the FRI base map reference, where appropriate. Also recorded are items comprising background information on the name, such as origins, appearance on historical/archival documents, earliest map reference dates, appearance in bibliographic sources, and so forth.

3. Provide Response to Enquiries

This Section provides information with regard to names for a variety of users. Users range from other government officials (municipal, federal/provincial), the private sector, authors, several mapping agencies (internal: OBM, Cartography Section, Survey Records; external: Department of Energy, Mines and Resources Canada, tourist mapping agencies).

OBSERVATIONS

The toponymic data base is a very important data base within any geographical referencing system. It is clearly a primary referencing vehicle for positionally related information within the province and associating relative toponymic information.

Much of the information maintained by this inventory has been derived from a variety of sources, including the Federal Toponymic Data Base, municipalities, surveyors, field studies, etc. One of the major tasks undertaken by this Section is to establish and record the common usage of names. It is also called upon to arbitrate in disputes beween the use of official versus local names and in other naming requests which are received.

The Section is clearly aware of the potential for automating its existing toponymic data base. They are conversant with the Federal Toponymic Data Base and are cognizant of many problems associated with it. The Section has investigated the use of VAX and Apple III systems to record the "names" data and to relate this information to data within the data base, especially, for those places which are common to both data bases.

FUTURE NEEDS AND WANTS

At this time, the major requirement of this Section is to develop an automated capability for maintaining a complete inventory of names within the province which can be referenced by position and location and has associated information.

There is also a need for a better set of guidelines which would be used to establish the provincial and municipal roles in naming within the province, and particularly within municipal boundaries. These guidelines are currently being developed by the OGNB.

G.I.S. POTENTIAL

There is limited G.I.S. potential for the toponymic data base. The data base is clearly meaningful within an overall geographical referencing system and, as such, would be referenced in the depiction of any spatial information. There may be a need for a number of geographically related functions, such as generalized query language to locate physical feature types within a given region.

The names that are associated with specific places in the toponymic data base would be meaningful for creating and maintaining a data dictionary for user interaction with a geographical information system.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

	NOMENCLATURE	TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
AGENCY FUNCTIONS 1									
3	Maintain geographic names inventory	□	●	●	●			●	

	NOMENCLATURE	CARTOGRAPHIC DATA						
		GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
AGENCY FUNCTIONS 1								
3	Maintain geographic names inventory							

	NOMENCLATURE	CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
AGENCY FUNCTIONS 1															
3	Maintain geographic names inventory														

	NOMENCLATURE	CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
AGENCY FUNCTIONS 1															
3	Maintain geographic names inventory														

	NOMENCLATURE	CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
AGENCY FUNCTIONS 1											
3	Maintain geographic names inventory										

	NOMENCLATURE	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS 1														
3	Maintain geographic names inventory													

10.3.4.5 SURVEYS SECTION SURVEY RECORDS UNIT

ORGANIZATION AND RESPONSIBILITIES

The main responsibilities of the Surveys Section are:

(i) to set policy for Crown lands surveys and resurveys, and to administer contracts for township boundary resurveys in Northern Ontario,

(ii) examine and approve Crown lands surveys for public and mining lands,

(iii) to prepare legal descriptions for various types of disposition and regulations, and

(iv) to maintain survey records affecting Crown lands.

The annual budget for this Section in 1982 was $1,400,000, of which $860,000 was for contracted township retracement surveys.

This Section has a staff of fifteen, consisting of: two Ontario Land Surveyors; six plan examiners and description writers; five persons responsible for maintaining the survey records, dealing with public inquiries regarding the survey records and producing copies of survey records; the section manager, and a bookbinder/map mounter.

TASKS/SYSTEMS

1. Store and Maintain Survey Records

The survey records management system is a manually operated, centralized facility for the storage, maintenance and dissemination of records of Crown lands surveys in Ontario. The system contains approximately 500,000 plans and documents consisting of:

- original township plans,
- original township field notes,
- township retracement survey plans and field notes,
- mining claim survey plans and field notes,
- copies of plans showing mining stakings (originals are maintained in the Mining Recorder Office),
- summer resort survey records of Crown lands,
- Crown lands subdivision survey plans and field notes,
- municipal surveys, and
- plans relating to Lake Erie oil and gas leases.

These records are stored on flat files, in filing cabinets and on shelves in the Survey Records Office. All of these plans and documents are on microfilm.

A particular plan or document can be located by using a card index and microfilm index. Both of these are located at the "public inquiries" counter at the Survey Records Office. The plans and documents are indexed by:

- township, lot and concession,
- surveyor's name,
- date of survey,
- location - sequential number inside unsubdivided townships, and
  - latitude and longitude outside the township.

2. Examine and Compile Survey Plans

The general steps taken, prior to storing a plan in the Records Office, are as follows:

1. The survey of a land parcel located on Crown lands is contracted to a private land surveyor by the applicant.

2. A survey is carried out and a survey plan is prepared by the surveyor.

3. Existing data is gathered and compiled by the office in conjunction with the contracted survey.

4. This survey plan is submitted to the Survey Services where it is examined and a description of the surveyed parcel is prepared. These descriptions are prepared in Toronto, mailed to the regional office for checking and returned to Toronto.

   If the documents (plans and descriptions) are in order, the plans are filed in the survey records system. Most are deposited as well in the local Registry Office.

Retracement survey activities (associated primarily with township boundaries) comprise the major part of this task.

OBSERVATIONS

The large number of irreplaceable plans and documents stored in the office present a security risk as well as the possibility of damage from the sprinkler system in the office and damage from handling on a daily basis. Many of the older plans are maintained here because of the difficulty to reproduce the subtle colours on the plans. In many instances, the colours on these maps have legal implications, and they do not show up well on microfilm.

Large quantities of survey plans are not indexed. This problem results in a considerable amount of time required for searching.

The five staff members who have worked with the survey records over the years have become quite familiar with the system. One problem faced by this Section is that it will lose the knowledge of the system retained by these employees once they retire.

Several studies of the records system have been carried out over the past two years regarding the existing indexing system; while these studies have resulted in a problem definition, no solution has been defined or implemented.

The OBM program makes extensive use of the survey records for the production of OBM maps.

The Surveys Section currently utilizes and Apple computer to prioritize the township boundary retracement surveys in Northern Ontario.

FUTURE NEEDS AND WANTS

In the near term, a computerized index system would facilitate the searching process for survey records. In the long term, a terminal located at the counter to display plans and text information would be useful.

The Survey Records Office maintains copies of mining staking plans. Staking information is received from the Mining Recorder Office and subsequently plotted manually on existing base maps. Due to the backlog of information and delays in transferring the information between the offices, copies of mining staking plans may be several weeks out of date. Many requests for mining staking plans are received by the Survey Records Office. Up to 800 requests for staking plans may be received (with copying charges of $0.50 per sheet) in one week during periods of heightened mineral speculation and exploration. A better storage and handling mechanism for these plans would be most useful.

The Surveys Section would like to automate the maintenance of the mining staking plans. This process would provide up-to-date staking plans and eliminate the drafting effort required to produce copies of the mining staking plans. To this end, the Mining Recorder Office would place the staking information on a digital base plan, possibly a digital OBM plan, and make it available via an on-line terminal and copying unit to Survey Records. This would also reduce the amount of storage space required for these copies at the Survey Records location.

G.I.S. POTENTIAL

This Section would benefit from using a G.I.S. for the purposes of indexing the 500,000 plans and documents that are maintained, and producing up-to-date digital mining staking plans. Potential for use of bibliographic data indexing, storage and retrieval is envisioned, as well as text data storage and retrieval.

DATA SOURCE INFORMATION SHEET

TITLE: Survey Records

SOURCE AGENCY: Survey Services

PERSON: D. E. Norris

TITLE: Manager, Surveys

ADDRESS: Whitney Block, Room 6643
Queen's Park

PHONE: (416) 965-2714

DESCRIPTION: storage of survey records of Crown lands in Ontario, including mining claim surveys

FORMAT:

	M	A	MEDIA
MAP	x		survey plans
TABULAR	x		hardcopy index
IMAGE			
TEXT	x		hardcopy
LIBRARY	x		hardcopy

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: approx. 500,000 plans of survey and documents

GROWTH RATE: 800 to 900 new survey plans per year

DATA ITEMS: plans of survey of Crown lands subdivision
- original field notes of Crown lands surveys
- compiled township plans (T-plans)
- mining claim records (M-plans)
- composite T & M plans (G-plans)

RETRIEVAL KEY(S): manual card & microfilm index: township, surveyor's name, date of survey, location (lot & concession, sequential number inside unsubdivided township & lat. and long.outside township fabric.

GEOCODE: township lot & concession; latitude and longitude where no township exists

DATE OF CREATION: some survey records date back to the late 1700's

FREQUENCY OF UPDATE: continuous

COVERAGE/COMPLETENESS: provincewide. Records exist where Crown surveys or mining land surveys have taken place.

SOURCE OF INFORMATION:
- surveyors performing Crown land surveys
- regional mining recorders offices

USERS OF INFORMATION: land surveyors, lawyers, prospectors, mining companies, drafting office for Land Titles, MNR, MCCR, OBM program and the general public

VOLUME/FREQUENCY OF USE:
- approx. 50 over-the-counter requests for plans and documents per day
- 200 to 300 copies of plans sold per week

ACCESS METHOD FOR USER: manual. The user must identify the plan or area and search through the index to obtain location if document in the storage room

AVAILABILITY: open

CHARGES: copying charges only

HARDWARE AND LOCATION: completely manual system based on flat files, filing cabinets, card index and storage shelves

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
problem of security for irreplaceable documents
- very old plans are handled by the public;
- large quantity of plans are not indexed;
- much of the filing knowledge is in the heads of the older employees who may soon retire.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: SURVEY RECORDS
NATURAL RESOURCES
LANDS AND WATERS
SURVEYS AND MAPPING BRANCH
SURVEY SERVICES

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA: GENERATION						CARTOGRAPHIC DATA: STORAGE
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Store & Maintain Survey Records		○		○			○								○
2 Examine and Compile Survey Plans	○	●	●	●	●	●		●							

AGENCY FUNCTIONS	CARTOGRAPHIC DATA: MANIPULATION / ANALYSIS: GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1 Store & Maintain Survey Records																	
2 Examine and Compile Survey Plans										●	●						

AGENCY FUNCTIONS	CARTOGRAPHIC DATA: MANIPULATION / ANALYSIS: DIGITAL TERRAIN MODELLING									QUERY		DISPLAY: COMPOSITION					DISPLAY: PRESENTATION				
	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Store & Maintain Survey Records											◐										
2 Examine and Compile Survey Plans										●	●										

AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Store & Maintain Survey Records		○	○							◐	◐	◐	
2 Examine and Compile Survey Plans		◐	◐							◐	◐	◐	

10.3.5 ONTARIO CENTRE FOR REMOTE SENSING

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Ontario Centre for Remote Sensing (OCRS) is to develop cost-efficient applications for remote sensing techniques to manage resources in Ontario, and to promote the adoption of these techniques as standard procedure by government organizations, the private sector and educational institutions in the province. The Section carries out research and development projects (sponsored or initiated in-house) and a comprehensive program of training, consultation and assistance in remote sensing application. Data from a range of airborne and spaceborne sensors is analysed by visual, optical/electronic and digital means. Map products are thematic as opposed to topographic. A staff of 24 fulfills these responsibilities.

TASKS/SYSTEMS

The Centre operates in large part on a project basis, thus, potential clients contract with OCRS for a specific project. All requested projects are completed on a cost-recovery basis. A supporting program of research initiated in-house is also conducted. Examples of sponsored projects include the completion of surficial geology mapping for Northern Ontario, agricultural and general land cover mapping, forest mapping north of latitude 52° N and forest regeneration assessment by aerial survey.

1. Geometric Registration and Correction

For a given project, OCRS receives aerial photos and other imagery recorded from aircraft, from the Canada Centre for Remote Sensing and other commercial sources. The Centre also operates facilities to obtain its own airborne imagery for sponsored and in-house research. Imagery recorded by the LANDSAT multispectral scanner is obtained from the Canada Centre for Remote Sensing (CCRS) and/or by the U.S. EROS Data Center.

Before commencing computer image analysis, OCRS registers the digital satellite data to the geometry of map sheets of the National Topographic Series.

2. Image Analysis and Classification

Image analysis and classification is performed according to the needs and specifications of the users. Image analysis classifies and colour codes the digital data into as many as 16 different themes, selected according to regional representation and the purpose of the maps. Control of the analysis results is provided by knowledgeable visual interpretation of satellite images and existing aerial photography, and by spot-checking in the field. Statistical analaysis and area or perimeter calculations of the polygons identified as representing a specific theme can be automatically provided, as required.

3. Image Display and Map Production

The analysis results are displayed on a colour graphics screen or in the form of maps produced using an ink-jet plotter. The information can be displayed selectively (i.e., certain themes may be displayed while others are not) and can also be superimposed to produce composite images. OCRS has directed the development of mapping software which produces a standard format map, complete with latitude and longitude references, UTM grid lines, annotation and a legend. Once the final map is printed, the classification results are archived to magnetic tape for use in potential future applications.

Image analysis is carried out using Dipex Systems Ltd. image analysis hardware and software. Mapping is carried out using an Applican Computerized Colour Plotter with a combination of Applicon basic software subroutines and OCRS specialized mapping software. Image analysis processing is performed using PDP 11/34 and PDP 11/44 minicomputers, as well as a PDP 11/23 microcomputer incorporated within the Dipex system. The two microcomputers have large secondary storage of 300 and 200 megabytes respectively.

A sample OCRS product is contained in Figure 10.3.5-A.

OBSERVATIONS

OCRS encourages the use of image technology by various sectors including private industry, governments and ministries. This is accomplished by providing a training service in image processing methods developed at OCRS as well as providing technical advice.

FUTURE NEEDS AND WANTS

With the launch of a new satellite in 1985, OCRS anticipates that the resolution of the image will improve from 30 metres on the ground to 20 metres and perhaps even 10 metres. The new satellite will also have the potential to provide stereo images from which topographic maps, up to scales of 1:50 000 could be produced. This process could be enhanced by having fixed control point transmitters from which the satellite would be able to register the imagery to within 10 centimetres on the ground. OCRS sees an opportunity to use this technology to establish more detailed inventories of land use, agriculture and forest cover.

G.I.S. POTENTIAL

OCRS possesses a functional common digital data base in LANDSAT digital satellite data. Automatic change detection has been successfully performed between analyses of data recorded over the same area in different years by means of logical operations among computer files registered to the common NTS map geometry.

OCRS also currently utilizes a broad range of G.I.S.-type data management procedures in its activities, including tabular data management procedures, cartographic data generation, storage, analysis and display techniques, and image data collection, storage and retrieval methods.

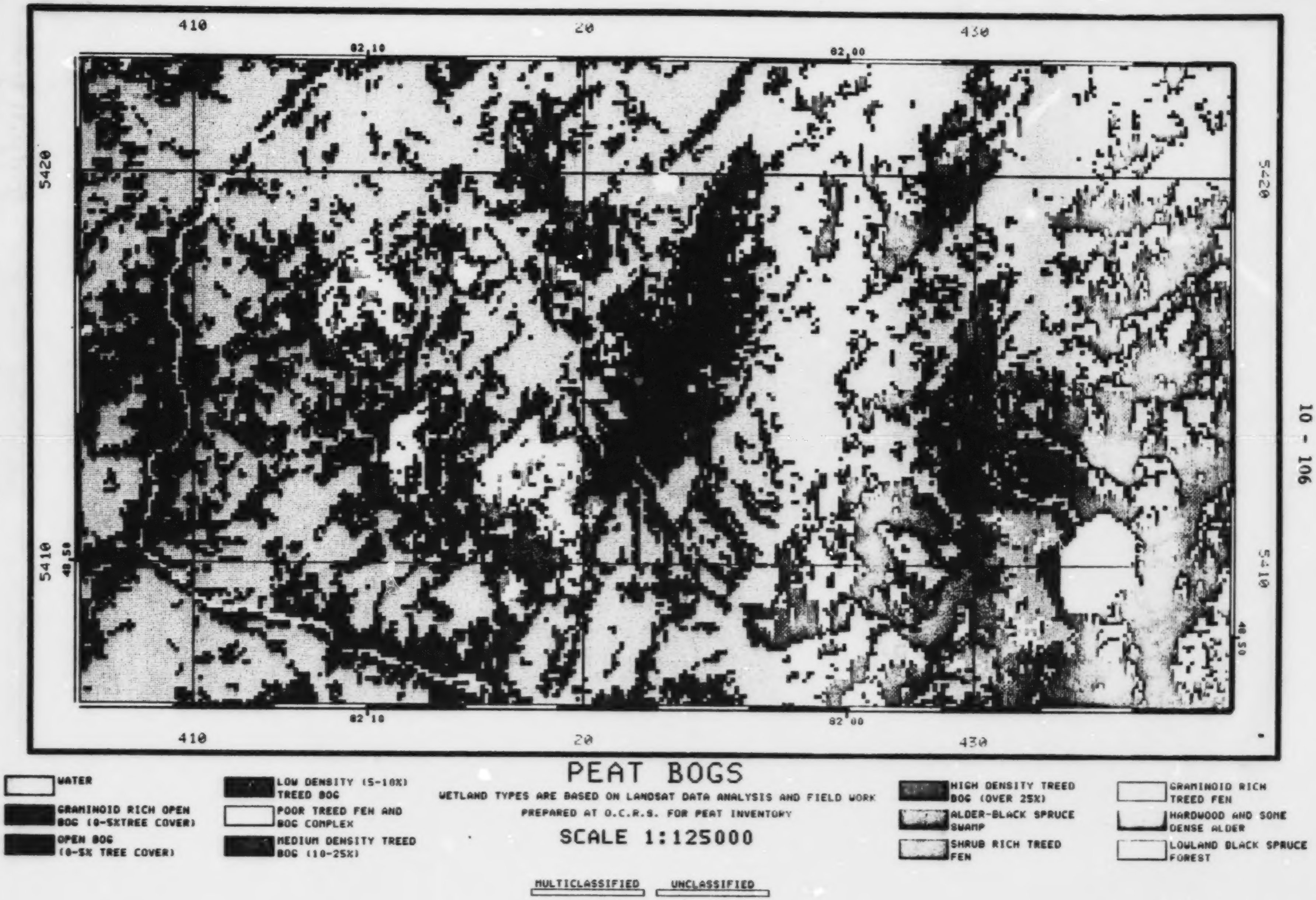

410
20
430
82 10
82 00
5420
5410
48 50
PEAT BOGS
WETLAND TYPES ARE BASED ON LANDSAT DATA ANALYSIS AND FIELD WORK
PREPARED AT O.C.R.S. FOR PEAT INVENTORY
SCALE 1:125000
WATER
GRAMINOID RICH OPEN BOG (0-5%TREE COVER)
OPEN BOG (0-5% TREE COVER)
LOW DENSITY (5-10%) TREED BOG
POOR TREED FEN AND BOG COMPLEX
MEDIUM DENSITY TREED BOG (10-25%)
HIGH DENSITY TREED BOG (OVER 25%)
ALDER-BLACK SPRUCE SWAMP
SHRUB RICH TREED FEN
GRAMINOID RICH TREED FEN
HARDWOOD AND SOME DENSE ALDER
LOWLAND BLACK SPRUCE FOREST
MULTICLASSIFIED
UNCLASSIFIED

Figure 10.3.5-A

DATA SOURCE INFORMATION SHEET

TITLE: OCRS

SOURCE AGENCY: OCRS
PERSON: Dr. Simsek Pala
TITLE: Chief Scientist
ADDRESS: 880 Bay Street
3rd floor
Toronto, Ontario

PHONE: (416) 965-8411

DESCRIPTION: corrected image files

FORMAT:

	M	A	MEDIA
MAP			
TABULAR			
IMAGE		x	tape
TEXT			
LIBRARY			

NOTE: line scan map

SCALE: N/A

ACCURACY/RESOLUTION: 80/30 metres on ground going to 20 an 10 metres with SPOT satellite in 1985

SIZE/VOLUME: 300 tapes

GROWTH RATE: 50-100 tapes/year

DATA ITEMS: spectral reflectance values, classified as per user requirements

RETRIEVAL KEY(S): N/A

GEOCODE: UTM base map according to user specifications

DATE OF CREATION: 1980

FREQUENCY OF UPDATE: as per project requirements

COVERAGE/COMPLETENESS: as per project requirements

SOURCE OF INFORMATION: image - CCRS (Canadian Centre for Remote Sensing), EROS

USERS OF INFORMATION: various ministries, municipalities, conservation authority, regions, districts, limited external work and private companies

VOLUME/FREQUENCY OF USE: project dependent

ACCESS METHOD FOR USER: image/map

AVAILABILITY: through project agencies

CHARGES: full cost recovery

HARDWARE AND LOCATION: Dipix Image Processing System, Norpak Display processor, Conrac Colour Display Monitor, Applicon Ink Jet Plotter;*

SOFTWARE:
1. Dipix image processing software
2. in-house mapping software

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

*utilizing PDP 11/23, 34, 44 processors, one 300 megabyte and one 200 megabyte disc.

Location: 880 Bay Street, 3rd floor

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: OCRS			TABULAR DATA								CARTOGRAPHIC DATA																																											IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
											GENERATION						STORAGE	MANIPULATION / ANALYSIS																													DISPLAY																						
																		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
LEGEND: O MANUAL PROCESS ● NOW DONE MANUALLY WANT TO AUTOMATE ● AUTOMATED PROCESS ☐ DON'T DO NOW BUT WANT TO			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	geometric																																																																		
		registration & correction																				●		●																						●		●	●	●	●				●	●	●	●										
	2	image analysis &																																																																		
		classification	0	●	●	●		●			●			●	●		●	●				●		●				●																		●	●	●	●	●	●				●	●	●	●										
	3	image display																																																																		
		produce a map																																										0	0	0	0	0	0				0	0	0	0										

10.3.5.1 ONTARIO LAND INVENTORY AND CANADA LAND INVENTORY

ORGANIZATION AND RESPONSIBILITIES

The Ontario Land Inventory (OLI) is a land resource inventory developed over the period 1967 through 1977. The data was collected using aerial photographs and was augmented with data collected by field crews. The objective of the OLI is to provide coverage of the landmass for various themes, specifically:

- **land classification** - is a system devised for the description of the physical features (slope characteristics of the land, soil depth and moisture regime). This information is combined into polygons called land units;

- **timber use capability** - is a rating which indicates the potential ability of the land to grow tree crops. Timber use capability ratings are specifically related to the physical features which control the rate of tree growth;

- **wildlife use capability** - indicates the natural ability of the land to provide the required habitat for a given species. The selection of a species for which an area is rated is based on the natural range of each species; and

- **recreation use capability** - classifies the land for its inherent ability to attract and sustain recreation use. The physical features of the land determine the intensity of use that can be attracted and sustained.

The Canada land Inventory (CLI) for Ontario is derived from the OLI. This inventory is prepared by the federal government using material provided by all provinces. For Ontario, these inventories are identical.

TASKS/SYSTEMS

1. Plot OLI Maps and Provide Distribution

The information in the OLI is stored in the form of maps which cover most of the south of the Hudson Bay Lowlands. The landmass is divided into land units, defined by the staff using existing standards and classifications. The polygon data is plotted on the 1:250 000 NTS base map. All themes are plotted on the 1:250 000 NTS series except for the wildlife use and recreation capability maps which are plotted on the 1:50 000 NTS series. There is little justification for updating OLI since the data is relatively time-independent.

The Unit distributes the OLI and CLI on request. The two inventories are generally available to all agencies, government offices and the public. Current users of this information include land use planners, consultants, universities and other interested members of the public.

OBSERVATIONS

The OLI and CLI are not being used to their full potential because of the following reasons:

1) there is limited awareness of the existence of or access to the OLI and CLI,

2) the paper medium is not effective for polygon overlay and other graphic analyses, and

3) the accuracy of the OLI and CLI is not consistent with most user requirements (e.g., not useful for site specific studies).

Since the OLI and CLI represent information that is invarient, these are still very relevant data sources today, especially for land management functions. The OLI and CLI are important data sources for land use planning and could provide valuable information to many other users if their availability were made known.

FUTURE NEEDS AND WANTS

If the OLI and CLI were available in digital format, the inventories could become a very useful tool for land use planning and wildlife management. They would provide a more versatile format for analysis, polygon overlay, graphic superimposition, etc. However, the organization did not articulate any specific needs or wants in this regard.

G.I.S. POTENTIAL

In automated format, the OLI and CLI could be a meaningful component of any subsequent geographical information capability in the context of recreational studies, forestry modelling, planning studies, wildlife management, and resource management.

Extensive use could be made of such generic software capabilities as polygon overlay, analysis, report generation, windowing, transformations, and buffering for the applications listed above.

DATA SOURCE INFORMATION SHEET

TITLE: OLI AND CLI

SOURCE AGENCY: Surveys and Mapping
PERSON: T.J. Ellis
TITLE: Staff Scientist
ADDRESS: 880 Bay Street, 3rd floor,
Toronto, Ont.
M5S 1Z8

PHONE: (416) 965-8411

DESCRIPTION:

FORMAT:

	M	A	MEDIA
MAP	x		
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1:250,000; 1:50,000 and 1:15,480

ACCURACY/RESOLUTION:
general overview accuracy

SIZE/VOLUME: 2,000 - 3,000 maps

GROWTH RATE: N/A

DATA ITEMS:
timber use capability, wildlife use capability, land classification, recreation use capability, shoreline and recreation capability

RETRIEVAL KEY(S):

GEOCODE: NTS map number

DATE OF CREATION: 1967

FREQUENCY OF UPDATE: N/A

COVERAGE/COMPLETENESS:
south of Hudson Bay Lowlands

SOURCE OF INFORMATION:
aerial photographs and field work

USERS OF INFORMATION:
ministries, consultants and universities

VOLUME/FREQUENCY OF USE:
2 years ago 10,000 maps
now - 3,000 maps

ACCESS METHOD FOR USER:

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION:
file cabinets, 880 Bay Street, 3rd floor

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: OLI AND CLI

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	MANUAL GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Plot OLI Maps & Provide															
	Distribution for															
	Inventory				◐				◐							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA																											
		MANIPULATION / ANALYSIS																											
		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Plot OLI Maps & Provide																												
	Distribution for																												
	Inventory	□				□	□	□																					

AGENCY FUNCTIONS		CARTOGRAPHIC DATA										IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		DISPLAY																						
		COMPOSITION					PRESENTATION																	
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Plot OLI Maps & Provide																							
	Distribution for																							
	Inventory						◐	◐	◐		◐													

10.4 MINERAL RESOURCES GROUP AND ONTARIO GEOLOGICAL SURVEY

The Mineral Resources Group is responsible for regulating the development of the province's mineral resources and encouraging the utilization of these resources within Ontario. The following Acts are administered by this Group:

- **Mining Act** - issuing and administering of exploratory licences and production leases of oil and natural gas on public lands.
- **Pits and Quarries Control Act** - regulating and issuing licences for pit and quarry operations.
- **Petroleum Resources Act** - providing licensing requirements for oil and natural gas exploration and production.
- **Mining Tax Act** - generating revenue by taxing profit of mine output.
- **Ontario Mineral Exploration Program Act** - providing incentives for mineral exploration.
- **Industrial and Mining Land Compensation Act** - providing agreements with landowners who leases land to a mining firm for protection against damage of land during operation of mine.
- **Gas and Lease Oil Act** - regulating oil and gas leases.

The Mineral Resources Group is divided into two branches, the Ontario Geological Survey and the Mineral Resources Branch.

The Ontario Geological Survey (OGS) deals with the operational aspects of developing the province's mineral resources. OGS has a number of field crews researching mineral resource potential in the province. The Geoservices Section within OGS is responsible for encouraging mineral exploration in the province by acting as an information bureau to both internal Mineral Resources Group staff and geologists working in the private sector.

The Mineral Resources Branch deals mainly with policy formulation and ensuring that Acts administered by the Group are monitored and enforced. Specifically, the Pits and Quarries Act is administered by the Industrial Minerals Section, Uranium Drill Holes are inventoried by the Metallic Minerals Section, and production and other relevant statistics are agregated and published by the Mineral Statistics Section.

An organizational structure diagram is contained in **Figure 10.4-A**, which depicts the organizational relations among these entities.

MINISTRY OF NATURAL RESOURCES

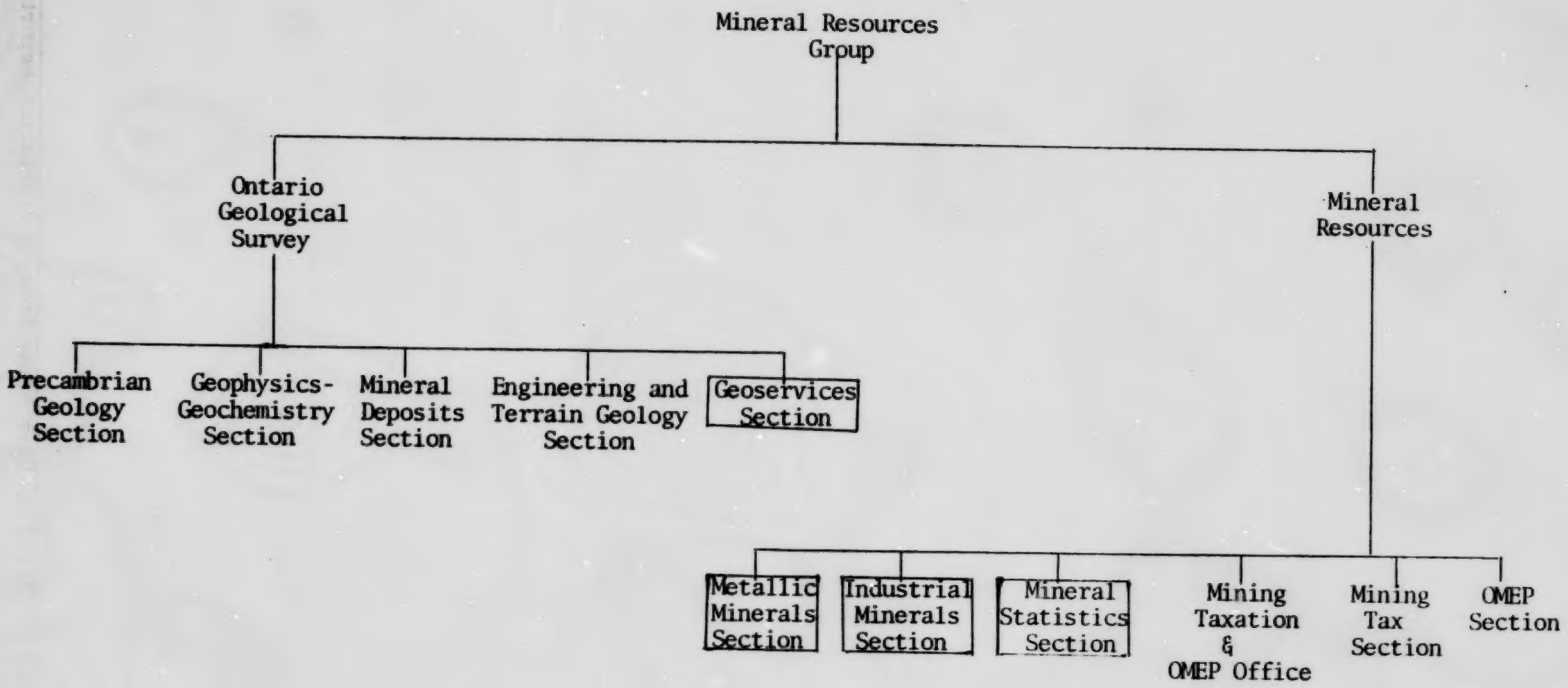

Mineral Resources Group
Ontario Geological Survey
Mineral Resources
Precambrian Geology Section
Geophysics-Geochemistry Section
Mineral Deposits Section
Engineering and Terrain Geology Section
Geoservices Section
Metallic Minerals Section
Industrial Minerals Section
Mineral Statistics Section
Mining Taxation & OMEP Office
Mining Tax Section
OMEP Section

Figure 10.4-A

10.4.1 MINERAL RESOURCES BRANCH

10.4.1.1 INDUSTRIAL MINERALS SECTION

ORGANIZATION AND RESPONSIBILITIES

The Industrial Minerals Section is responsible for the management of all industrial mineral resources in the province. The Section oversees administration of the Pits and Quarries Control Act by monitoring and advising on aggregate operations in pits and quarries. Much of the administration role is decentralized to the district offices, and this Section does not become involved unless there is a politically sensitive issue.

Specifically, this Section examines current and past industrial mineral extraction volumes, economic trends and various other relevant information in developing policy and legislation regarding industrial minerals, including aggregates.

A staff of five complete the tasks required to fulfill this Section's responsibilities.

TASKS/SYSTEMS

1. Conduct Industrial Mine Inspections

District Inspectors visit quarry and pit sites in order to ensure that the private companies comply with the Pits and Quarries Control Act. These visits are conducted as required each year, depending on the number of violations or complaints received by the district offices on a particular pit or quarry. All records of these visits are kept at the district offices.

2. Prepare Annual Reports on Industrial Mines

The district offices provide data on all pits and quarries annually to the Industrial Minerals Section. This includes the following information: company name and address, the tonnage extracted (confidential information), the number of hectares that have been rehabilitated, the amount of land that has been disturbed, the pit and quarry reference number, the date of issue of the licence reference number and the location by district, lot and concession. Financial data including the amount of money paid for security deposit required to rehabilitate the land is also included. All of this data, when received by the Section, is entered on cards and filed with this office.

The Industrial Minerals Section performs a variety of data manipulations including: totalling the tonnage extracted, calculating tonnage per region, district, municipality, and so on. The Section uses this data to monitor the economic situation in the industrial minerals field and, ultimately, for use in determining appropriate policy directions (including future legislation).

The Ministry of Transportation and Communications uses the Tonnage and Acreage Reports to enhance their quarry and pit inventory. This information is used to produce an aggregate sources list for road construction. The Industrial Minerals Section has access to this data via hard copy. Another user of pit and quarry production and financial information is the Financial Services Branch for administering the financial aspects of the Pits and Quarries Control Act.

3. Collect and Disburse Mining Extraction Funds

Recent legislation requiring private companies to pay six cents per tonne for aggregates extracted and removed from a pit or quarry will modify the responsibilities of the Section. The six cents per tonne will be distributed among the municipality, the region, the province and an abondoned pit and quarry rehabilitation fund. This will require that the Section maintain a record of production and monies collected and disbursed.

With regard to the six cents per tonne levy, information on wayside permits, which are necessary for the extraction of aggregates on a temporary basis, must be maintained within this Section. Currently, records exist at the district level. However, for monitoring production levels, this Section will require similar records. Approximately 200 to 300 wayside permits are issued per year.

4. Respond to Public Enquiries

Public inquiries are also received by the Industrial Minerals Sections. These are redirected to the district offices.

OBSERVATIONS

The Industrial Minerals Section operates very effectively in its current manual mode. Its scope is well-defined, partly due to the Pits and Quarries Control Act. Its primary funtion is that of policy formulation and monitoring and controlling various pit and quarry activities.

In carrying out this function, it maintains simple records which are currently being automated on a small Digital PDT/180 personal computer. This task is only in the initial stage. However, it is expected that the data will be on-line within four or five months. The Section will oversee approximately 2,500 licences. There is very limited use of this data by others, which could readily be produced in hard copy form if necessary.

FUTURE NEEDS AND WANTS

The Section has indicated a desire to automate the district office operations so that the data provided by these offices would be available on-line in digital format. Automation of district offices would eliminate the need for the Industrial Minerals Section to enter this data into their own system.

The Industrial Minerals Section's needs for record management will be clearly met by having their own small personal computer.

G.I.S. POTENTIAL

There is limited G.I.S. potential for this Section in its present state. For industrial mine inspections, a system would be useful for tabular data entry, storage and update activities. The collection and disbursement of funds would also employ these procedures, while on-line query would be useful in response to public enquiries.

However, in a global perspective, this information could be used within the general context of a geographical information system for various planning and administrative activities. Specifically, information regarding the allocation of permits to a region based upon specific constraints, such as current land use, would require various G.I.S. functions. These might include point in polygon searches to determine the number of permits in an area, and polygon overlay for identifying rehabilitated lands.

DATA SOURCE INFORMATION SHEET

TITLE: Tonnage and Acreage Reports

SOURCE AGENCY: Industrial Minerals Section
PERSON: Sherry Yundt
TITLE: Supervisor
ADDRESS: Whitney Block
Room 4646
Toronto, Ontario

PHONE: (416) 965-1172
DESCRIPTION: inventory of industrial minerals extractions for quarry and pit permit

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	x		cards
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 2,500 records

GROWTH RATE: 50 to 100 records per year

DATA ITEMS: company name, company address, tonnage extracted (confidential), number of hectares of land rehabilitation, number of hectares of land disturbed, licence reference number, date of licence issue, location by district, lot, concession

RETRIEVAL KEY(S): licence number

GEOCODE: district, lot, concession

DATE OF CREATION: 1972

FREQUENCY OF UPDATE: once annually

COVERAGE/COMPLETENESS: Southern Ontario

SOURCE OF INFORMATION: district office

USERS OF INFORMATION: MTC, internal mineral planning, public, financial management section

VOLUME/FREQUENCY OF USE: 20 times per week

ACCESS METHOD FOR USER: card retrieval, phone

AVAILABILITY: limited - tonnage & financial is confidential

CHARGES: none

HARDWARE AND LOCATION: file cabinet
Whitney Block,
Room 4646

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.) moving towards automated records management or micro computer

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: TONNAGE & ACREAGE REPORTS

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Conduct Industrial								
	Mine Inspections		◐	◐	◐				
2	Prepare Annual Reports								
	on Industrial Mines								○
3	Collect & Disburse								
	Mining Extraction								
	Funds		◐	◐	◐				
4	Respond to Public								
	Enquiries							◐	

AGENCY FUNCTIONS		CARTOGRAPHIC DATA: GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE MANAGEMENT
1	Conduct Industrial							
	Mine Inspections							
2	Prepare Annual Reports							
	on Industrial Mines							
3	Collect & Disburse							
	Mining Extraction							
	Funds							
4	Respond to Public							
	Enquiries							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA: MANIPULATION / ANALYSIS: GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Conduct Industrial														
	Mine Inspections														
2	Prepare Annual Reports														
	on Industrial Mines														
3	Collect & Disburse														
	Mining Extraction														
	Funds														
4	Respond to Public														
	Enquiries														

AGENCY FUNCTIONS		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Conduct Industrial														
	Mine Inspections														
2	Prepare Annual Reports														
	on Industrial Mines														
3	Collect & Disburse														
	Mining Extraction														
	Funds														
4	Respond to Public														
	Enquiries														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA: DISPLAY: COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Conduct Industrial										
	Mine Inspections										
2	Prepare Annual Reports										
	on Industrial Mines	○					○	○			
3	Collect & Disburse										
	Mining Extraction										
	Funds										
4	Respond to Public										
	Enquiries										

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Conduct Industrial													
	Mine Inspections													
2	Prepare Annual Reports													
	on Industrial Mines													
3	Collect & Disburse													
	Mining Extraction													
	Funds													
4	Respond to Public													
	Enquiries													

10.4.1.2 METALLIC MINERALS SECTION DRILL HOLE FILES SYSTEM

ORGANIZATION AND RESPONSIBILITIES

The primary goal of this project as undertaken by OGS is to build and maintain an inventory of uranium drill holes. This activity is confined to the Elliot Lake district, primarily because of the nature of the deposit being amenable to this type of study. Data is used in conjunction with the federal Department of Energy, Mines and Resources (EMR) in evolving potential uranium resources. Currently, the tasks required to fulfill this responsibility are done by a staff of one.

TASKS/SYSTEMS

1. Maintain Uranium Drill Hole Inventory

In developing a drill hole inventory, the initial activity was to create appropriate drill hole maps based on field surveys as well as other positional information derived from aerial photographs. Drill hole location information in the inventory is also provided by private companies. This drill hole information was superimposed on the FRI base maps at a scale of 1:15 840.

Upon completion of field mapping, it was possible to build up an inventory to known uranium reserves and resources. This was done by listing the townships and a summary of drill holes within each township. Initially, these were manual tabular files, but the system is now automated and maintained as a separate file.

Using the inventory, a minimum amount of analysis, e.g., number of drill holes in a given area, is done. Recommendations for uranium policies can be developed based upon this analysis.

The Drill Hole File consists of relevant information on drill holes. It contains approximately 1,000 records and is related specifically to uranium deposits for the Elliot Lake region. This project was started in 1975 and was maintained on the Queen's Park Computer Centre. This file is now inactive and has been archived, since there is no current demand for the data except for use of a companion file by EMR.

In essence, it provides an inventory of relevant drill hole data for use, specifically, with uranium deposits. A complete description of the file contents is shown in Figure 10.4.1.2-A. The file contains location identifiers as well as relevant geological information.

OBSERVATIONS

In preparing the uranium drill hole inventory, a number of problems arose. Firstly, the accuracy of the FRI base maps was questionable in that the depiction of features was not consistent in terms of the relationship to known points as shown in the NTS maps.

Lake and surface elevation data was very poor because much of the data was derived from hand-held barometers and was not developed consistent with the notion of closed traverses. The discrepancy for lake elevations was noted from the use of the NTS maps to derive elevation data. Field validation was required in order to obtain more accurate information.

Another difficulty arose in trying to uniquely identify the township from the base map data available, since township boundaries are not accurately recorded.

The use of the Drill Hole File by the public has declined as a result of the limited uranium mining activity currently being undertaken. However, a companion file at EMR was used in an unpublished special study entitled "Elliot Lake Uranium Resource", which was completed earlier this year.

FUTURE NEEDS AND WANTS

The Section indicated a desire to have a facility for locating their data on an accurate set of base maps.

G.I.S. POTENTIAL

Other than using a G.I.S. system for superimposing drill hole information on an accurate base, the Section would not benefit from access to such a system. However, in a more general context, on-line access to such inventory data would facilitate decision making, especially with the availability of computer based modelling tools.

URANIUM DRILL HOLE FILE
Data Items Recorded

Code	Description
C 1*	HOLE DESIGNATION
C 2*	COMPANY NAME
C 3*	ODM-GSC INDEX NUMBER
C 4*	TOWNSHIP
C 5*	YEAR DRILLED
C 6*	LENGTH OF HOLE (Feet)
C 7*	LATITUDE
C 8*	LONGITUDE
C 9*	ELEVATION (Feet)
C10*	ELEVATION-REFERENCE
C14*	EASTING
C15*	NORTHING
C16*	UTM ZONE
C11*	STRATA (Repeating Group)
C110*	FORMATION NAME
C111*	INCLUDES (Lithological or member name)
C112*	FROM (Feet)
C113*	TO (Feet)
C114*	FOOTWALL-LATITUDE
C115*	FOOTWALL-LONGITUDE
C116*	FOOTWALL-ELEVATION
C117*	FOOTWALL-EASTING
C118*	FOOTWALL-NORTHING
C119*	FOOTWALL-UTM ZONE
C104*	HANGING WALL-LATITUDE
C105*	HANGING WALL-LONGITUDE
C106*	HANGING WALL-ELEVATION
C107*	HANGING WALL-EASTING
C108*	HANGING WALL-NORTHING
C109*	HANGING WALL-UTM ZONE
C12*	ASSAYS (Repeating Group)
C120*	FROM (Feet)
C121*	TO (Feet)
C122*	U308-LBS per ton
C123*	TH02-LBS per ton
C124*	U308-ESTIMATE (Radioactive Count, XBG)
C125*	TH02-ESTIMATE (Radioactive Count, XBG)
C126*	REMARKS

Geoscience Data Centre
Ontario Ministry of Natural Resources

January 1978

Figure 10.4.1.2-A

DATA SOURCE INFORMATION SHEET

TITLE: Uranium Drill Hole File

SOURCE AGENCY: Geoservices Section
PERSON: Hank Groen
TITLE: Chief Geoscience Data Centre
ADDRESS: 77 Grenville Street
Room 804
Toronto, Ontario
PHONE: (416) 965-1337

DESCRIPTION: inventory of uranium drill hole locations in the Elliot Lake area

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	archived on tape
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 1,000 drill holes

GROWTH RATE: 0

DATA ITEMS: hole designation, company name, township, year drilled, length of hole, UTM zone, northing, easting, and other specific drill hole characteristics (see Appendix A)

RETRIEVAL KEY(S): location, company

GEOCODE: township, UTM co-ordinates

DATE OF CREATION: 1974

FREQUENCY OF UPDATE: 0

COVERAGE/COMPLETENESS: Elliot Lake

SOURCE OF INFORMATION: region, uranium file, company data

USERS OF INFORMATION: not currently used
EMR for resource evaluation

VOLUME/FREQUENCY OF USE: 0

ACCESS METHOD FOR USER:

AVAILABILITY: restricted

CHARGES: none

HARDWARE AND LOCATION: Queen's Park Computer Centre, IBM mainframe

SOFTWARE: data base 2

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

DRILL HOLE FILE

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

		TABULAR DATA								CARTOGRAPHIC DATA																																														IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
										GENERATION						STORAGE	MANIPULATION / ANALYSIS																												DISPLAY																						
																	GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
AGENCY FUNCTIONS		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	maintain uranium drill hole inventory	○	●	●	●		●		●														□																										●		●			●													

10.4.1.3 MINERAL STATISTICS SECTION CENSUS OF MINES, QUARRIES AND SANDPITS

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of this Section is to provide the orderly management of a large number of mineral-related file systems. In this capacity, the Section acts as a data base administrator for the Census of Mines, Quarries and Sandpits. The functions performed to fulfill this mandate are:

1. Data administration, correction, entry, edit and update.
2. Designing file systems for storing, maintaining and accessing information.
3. Preparation of standard and special reports.

The census data dates back 100 years and has moved from the original manual system to digital files. A staff of three are required to complete the tasks which fulfill this responsibility.

TASKS/SYSTEMS

1. Administer and Collect Mine Census Data

Standard questionnaires are sent to private mining companies on an annual basis. The questionnaires which are very detailed and complex, request information on current inventory, production, taxes, cost to market, cost to ship, cost to store, employee data, workload changes over a month, the location of the mine by township, lot, concession, etc.

When the Section receives the completed forms, a detailed edit phase begins. The staff checks for completion of forms and validate that information is consistent within the industry. Fifty per cent of the staff's time each year is spent on editing and validating these questionnaires.

Once these questionnaires have been validated, the Section enters the data via formatted screen onto the computer system. The software used is "1022 DBMS" on a DEC System 10 at Dataline. When this raw data has been validated and corrected, a number of programs are run against the data base. These programs aggregate data to produce a variety of statistical analyses and generate standardized reports. Since much of the raw data is confidential information, any ad hoc queries for public reports are answered in aggregate format.

2. Design File System

The data files are maintained on a number of large mainframe computers. Most of the data is stored on Dataline's DEC 10, although some use is made of the Ministry of Government Services Computer Centre and the TYMSHARE Service Bureau. The data is stored in terms of a number of fixed formatted files and merged by the 1022 DBMS. There are approximately 700 data sets, with as many as 200 to 300 active during the report generation phase. The data is entered using one of approximately 200 data entry screens.

3. Report Information

The major activity in this Section is concerned with producing the Annual Ontario Mineral Score Document. This requires processing of certain files before running the report generator. Once the reports are produced, the data is archived. There is sufficient capability in the report generator through DPL (Data Programming Language) to allow the user to define and prepare his/her own report. At present, there is no standard data dictionary, although there is a data description as part of the 1022 DBMS for all data items and appropriate documentation for each file. This documentation is maintained on a personal computer using SELECT word processing. The documentation can be updated by transmitting structured components of the document to a VT 100 for local editing.

At present, statistical packages such as SAS and SPSS are only used on an ad hoc basis since the basic statistical report satisfies most of the statistical requirements. Much of the data stored in these files can be made available in an on-line capacity for use by a wide spectrum of users.

The data is linked to Geographical, Administrative and Planning maps (GAP maps). These maps were developed in order to correlate information in the five different spatial entities that are found in Ontario. The five entities are:

1) Townships (named and pseudo),
2) MNR regions and districts,
3) MNR planning boundaries,
4) Mining division and areas, and
5) Municipal boundaries.

The GAP maps provide a description of all of these entities in relation to each other, e.g., where they overlap. For example, by keying in a township, the associated MNR region, district and MNR planning boundaries, mining divisions or municipal boundaries are linked with this township. The township is then used to make associations to the other spatial entities. The data can be referenced by examining either the plotted map or by keying in one of the spatial entities as reference.

OBSERVATIONS

This Section maintains a statistical data base and provides access to raw data through statistical packages. The data base consists of a large number of files which are stored by application area. By archiving the data on a yearly basis, a historical perspective of the data is maintained.

FUTURE NEEDS AND WANTS

The Section indicated that a capability for on-line query of both the raw data and the statistical data would be of benefit in answering ad hoc queries that are received by this Section. The Section is working with the Dataline Computer Service Bureau to determine the feasibility of public access via terminal menus to ad hoc reports created by the public user from the aggregate data bases.

G.I.S. POTENTIAL

Since the data collected, maintained and stored by this Section is positionally related, it could be useful to a large number of users within a geographical information system environment. By means of a common data dictionary, generalized access to this information could be facilitated. The current system used to store and maintain the data is fulfilling all of the current requirements. Geometric analysis is not a requirement for this Section per se, although other users may use this data in order to do point in polygon searches, buffering, and other procedures.

DATA SOURCE INFORMATION SHEET

TITLE: Mineral Statistics

SOURCE AGENCY: Mineral Resources Group

PERSON: Gary Weatherson

TITLE: Data Systems Co-ordinator

ADDRESS: Whitney Block, Room 4620
Queen's Park
Toronto, Ontario

PHONE: (416) 965-0211

DESCRIPTION:

FORMAT:	M	A	MEDIA
MAP			
TABULAR		X	tape, disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: as per application area

SIZE/VOLUME: 700 data sets, total 150 megabytes

GROWTH RATE: 10 megabytes per year; survey 3,000 mining companies

DATA ITEMS: commodity, volume, dollar value, resources to produce, location

For more detailed list see Ontario Mineral Score Publication

RETRIEVAL KEY(S): can key on any attribute (field in record) at any time (before, during or after the database is created and loaded) but for efficiency only most common sorting attributes are keyed*

GEOCODE: township and latitude/longitude point data

DATE OF CREATION: data dates to 1890; digital file created 1974 from aggregate data, **

FREQUENCY OF UPDATE: annually but different data sets each week

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: survey forms

USERS OF INFORMATION: Ontario Geological Survey, mining industry

VOLUME/FREQUENCY OF USE: high

ACCESS METHOD FOR USER: reports (published and custom)

AVAILABILITY: general, except for some privileged information

CHARGES: none

HARDWARE AND LOCATION:
1. dataline DEC System 10
2. MGS Computer Centre
3. TYME SHARE

SOFTWARE:
1. video, censor, custom application using screen generator
2. scope, data entry
3. 1022 DBMS

~~NOTES/PROBLEMS/DEPENDENCIES/ETC.~~

4. Focus on a 370
5. SAS on TYME SHARE
6. Fortran on DEC 10

*(commodity, area, mineral, valume, value, etc.)

**1980 from raw data

GEOGRAPHIC DATA MANAGMENT PROCEDURES

TITLE: Mineral Statistics Section		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGMENT
AGENCY FUNCTIONS	Design file system	○	◐		●											
	Administer and collect data	○	●	●	●	●	●	☐	●							
	Reporting information															

	CARTOGRAPHIC DATA																											
	MANIPULATION / ANALYSIS																											
	GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
Design file system																												
Administer and collect data																												
Reporting information																												

	CARTOGRAPHIC DATA										IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	DISPLAY																						
	COMPOSITION					PRESENTATION																	
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
Design file system														●	●	●	●						
Administer and collect data																							
Reporting information																							The GAP
																		●	●				map is referenced
																							for analysis

10.4.2 GEOSERVICES SECTION

ORGANIZATION AND RESPONSIBILITIES

The Ontario Geoscience Data Centre was established in 1972. The Geoscience Centre provides data repositories for geological data, compiles data, maintains indices of relevant geological data and retrieves data for in-house staff and industry. The Section also acts in a consulting and co-ordinating capacity to other sections in OGS and to geological field offices as required.

One data processing professional is retained in the Section, while another staff person has acquired a sound knowledge in System 2000 data base creation and maintenance, mathematical data analysis and programming techniques.

The Section's primary role is to create and maintain a number of data bases and manual repositories for public access. In this capacity, it provides a leadership role for data processing activities in the Ontario Geological Survey. Users of data maintained in the Centre include OGS staff, the MNR Mining Lands Sections, and the mining industry.

TASKS/SYSTEMS

A number of file systems and data bases are currently maintained by this Section. These include:

1. Maintaining Relevant Inventories

a. Mineral Deposit Data File

The Mineral Deposit Data File contains approximately 5,500 records. The information maintained on the file is skeleton data used for query purposes. Information is plotted on a variety of index maps, depending on the base maps which are available. For areas west of 85^{o} latitude, the data is plotted on NTS base maps. For areas east of 85^{o} latitude, the information is plotted on the FRI township base maps. An external commercial firm, Data Plotting, is used for producing plots from data on magnetic tapes. Because of the lack of base maps, limited plotting can be done.

The information filed within the manual Mineral Deposit File is gleaned from a variety of Ontario Geological Survey Reports. The information is compiled and maintained by the Geoscience Data Centre.

b. Rock Chemistry Data File

A rock chemistry data base is also maintained on the Queen's Park Computer. This file contains numeric data as well as some relevant geological data. There are approximately 14,000 records in this data base, which is still being created. Data may selectively be down-loaded to a PDP 12/34 located in the Geoscience Laboratories of OGS.

c. Bibliographic File

The Bibliographic File is an index file to information contained in Mineral Resources Group publications and exploration reports received from the industry. In addition to ad hoc retrieval, it is used for producing published indices.

2. Computing Resources

The Section relies on the Queen's Park Computer Centre for maintaining most of its data. The Mineral Deposit Data File and the Rock Chemical File as well as the Bibliographic Index are maintained on System 2000 DBMS. A Core Index System has been developed on DBASE II for the Apple IIe personal computer.

Whenever plotting services are required, the information is carried to Data Plotting Services where it may be plotted as a separate activity.

OBSERVATIONS

This Section has suffered from a lack of resources caused by financial constraints. The primary function is thus limited to maintaining data files for the variety of uses of geological information.

One of the needs of this Section is to provide better means of user access to its data. To this end, attempts are being made to repackage material and provide it in a more readily suitable format for users.

Although the original mandate was for collecting and maintaining geological information, there is clearly a new mandate developing to provide leadership for setting a framework for data processing within the entire OGS.

The Ontario Geological Survey relies on resident-geologists within the regions for much of its data. This is augmented by information from private companies as well as the federal Geological Survey of Canada.

It would appear that the Branch must re-evaluate its position and assert itself, more specifically in terms of what must be done. This is important in being able to respond to change in technology as well as its needs to serve the public.

FUTURE NEEDS AND WANTS

If financial support were available, a desire for an on-line inquiry system (e.g., terminal access to all users) to facilitate access to existing data might be fulfilled.

There is also a need for access to much of the existing information in graphical format. This could be provided in the form of base maps as well as via a graphic screen. Such a screen could provide capabilities for performing a variety of graphic functions including colour, highlighting, zooming, symbology, etc.

There is also a need for establishing common standards, not only for geographical information, but also for geological information. At present, there is some need for a digital OBM base map for plotting thematic data.

Since this Section is primarily responsible for maintaining inventories of data, there is no real need for many of the generic functions to be performed within the environment of a comprehensive geographical information system. These needs could be developed in time, however, it is unlikely that this requirement would develop for quite some time.

G.I.S. POTENTIAL

There is limited G.I.S. potential for the Geological Survey at this time, primarily because of the current form of manual operation. However, there is potential application of a G.I.S. for plotting locational data (e.g., mineral deposit data) onto a digital base for graphic depiction. In terms of providing an inquiry service to the public, the availability of a comprehensive geographical information system would most likely generate applications and uses which would benefit from access to geological information as well as its depiction.

DATA SOURCE INFORMATION SHEET

TITLE: Mineral Deposit File

SOURCE AGENCY: Geoscience Data Centre
PERSON: Henk Groen
TITLE: Chief, Geoscience Data Centre
ADDRESS: 77 Grenville Street
Room 804
Toronto, Ontario

PHONE: (416) 965-4641

DESCRIPTION: an inventory of mineral deposits in Ontario

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 5,500 records

GROWTH RATE: 200

DATA ITEMS: position by longitude/latitude and UTM, commodities data, status etc. (see Appendix)

RETRIEVAL KEY(S): location, township, NTS name, Commodity deposit

GEOCODE: township, UTM co-ordinates

DATE OF CREATION: 1970's

FREQUENCY OF UPDATE: monthly

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: existing geological publications

USERS OF INFORMATION: internal to OGS, exploration purposes for prospectors and mining industry

VOLUME/FREQUENCY OF USE: several times daily

ACCESS METHOD FOR USER: generated reports

AVAILABILITY: general

CHARGES:

HARDWARE AND LOCATION: Queen's Park Computer Centre, IBM mainframe

SOFTWARE: S2K

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: Rock Chemistry Data File

SOURCE AGENCY: Geoscience Data Centre
PERSON: Henk Groen
TITLE: Chief Geosciences Data Centre
ADDRESS: 77 Grenville St, Rm 804
Toronto, Ont

PHONE: (416)965-4641

DESCRIPTION:

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: unknown

GROWTH RATE: unknown

DATA ITEMS:
project number, geologist, latitude/longitude, UTM Zone UTM coordinates, township, rock name, age, specimen, comments, confidentiality, NTS

RETRIEVAL KEY(S):
NTS, township, commodity

GEOCODE: township, NTS, UTM

DATE OF CREATION: 1970's

FREQUENCY OF UPDATE:
monthly

COVERAGE/COMPLETENESS:
Ontario

SOURCE OF INFORMATION:
existing geological publications

USERS OF INFORMATION:
internal to OGS, mining industry and prospectors

VOLUME/FREQUENCY OF USE:
several times daily

ACCESS METHOD FOR USER:
generated reports

AVAILABILITY:
general

CHARGES:
none

HARDWARE AND LOCATION:
Queen's Park Computer Centre, IBM mainframe

SOFTWARE:
SZK

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: Ontario Geoscience Index

SOURCE AGENCY: Geoscience Data Centre
PERSON: Henk Groen
TITLE: Chief, Geoscience Data Centre
ADDRESS: 77 Grenville Street
Room 804
Toronto, Ontario
M5S 1B3
PHONE: (416) 965-4641

DESCRIPTION: index to information in Mineral Resources publications and unpublished exploration reports

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 15,000

GROWTH RATE: 1,000

DATA ITEMS: internal document number, status of report (unpublished or published), maps, subject, e.g., precambrian, Paleozoic, etc. (see Appendix)

RETRIEVAL KEY(S):

GEOCODE: township, NTS

DATE OF CREATION: 1970s

FREQUENCY OF UPDATE: monthly

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: existing publications

USERS OF INFORMATION: internal to OGS, exploration purposes for prospecting and mining industry

VOLUME/FREQUENCY OF USE: several times a day

ACCESS METHOD FOR USER: generated reports

AVAILABILITY: general

CHARGES: none

HARDWARE AND LOCATION: IBM mainframe at Queen's Park Computer Centre

SOFTWARE: SZK

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: GEOSCIENCE DATA CENTRE			TABULAR DATA								CARTOGRAPHIC DATA																																										IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
											GENERATION						STORAGE	MANIPULATION / ANALYSIS																														DISPLAY																						
																		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY			COMPOSITION					PRESENTATION																	
LEGEND: ○ MANUAL PROCESS ● NOW DONE MANUALLY WANT TO AUTOMATE ● AUTOMATED PROCESS ☐ DON'T DO NOW BUT WANT TO			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Maintain Relevant Geologic Data	○	●	●	●			●	●																																								●	☐																	

10.4.3 SCIENTIFIC REVIEW OFFICE

ORGANIZATION AND RESPONSIBILITIES

The Scientific Review Office is a unit within the Geological Survey Branch responsible for the preparation and publication of all documents produced by the Geological Survey Branch. As part of this role, it provides a service for approximately 65 geologists within OGS and other scientific groups. Its principal mandate is to provide cartographic and publication services about geological investigations throughout the province. The specific responsibility of this office is to take draft material (i.e., maps, text and related graphics), and upgrade the information to increase its accuracy, clarity and cartographic presentation for the production of published reports, working papers and supplemental maps and graphics which are disseminated to the public.

In providing these products and services, the Scientific Review Office has a staff of 27 persons including six geologists, seven draftsmen, four geological assistants and a variety of other administrative and technical support staff. The geologists and geological assistants edit the geological manuscripts, maps and text prior to final publication.

This group currently publishes approximately 80 geological reports and 250 geological maps each year. In addition, it is responsible for final editing of geophysical maps and several hundreds of maps each year. Fifteen different map types are produced, primarily in black and white, and periodically in colour for reproduction and printing. This colour reproduction activity is mainly done by the Cartographic Section of the Surveys and Mapping Branch.

SYSTEMS/TASKS

1. Prepare Geological Publications

The following series of tasks describe the basic functions of this Unit:

Staff from this Unit communicate with geological field staff in formatting information according to given standards. Field geologists are responsibile for data collection and geological mapping using a variety of original materials, e.g., air photographs, core samples, field work and supplemental maps.

The mapping component involves mapping geologic units or other features and points on air photographs which are subsequently transferred over to a Mylar base map. The predominant base map is the FRI 1:15 480, although a variety of other base maps are used at varying scales, including OBM maps.

The process of transferring from the air photos to a base map is typically done with pen and ink drafting by the field geologists in their field camps before it is given to the Scientific Review Office. The field geologists also provide up to 10,000 words of text describing the various geological units and their interpretations for each map. This mapping and text writing activity involves a great deal of data reductions from a variety of different sources to produce a series of maps and reports. The field geologists also prepare formal book-length reports for publication, which are accompanied by coloured geological maps.

It is often necessary to reformat and enhance the orginal map data. Specifically, this preparation typically involves the addition of names, redrafting topography, additions to labels, integration of text legends, validate the maps (e.g., checking information codes to ensure that they are correct relative to general Ontario geology), and so forth. There is also a process of associating the text information with information displayed on the maps.

Before final publications, all manuscripts (i.e., maps and associated documents) are reviewed by the original authors of the information.

After preparation of the initial text and graphic composition of the manuscript data, the Scientific Review Office goes through a series of steps to produce final publications which are subsequently disseminated to the public and various Ministry offices within the province. For instance, most of the mapping publications are done with white prints; therefore, they require basic oxilate reproduction capability. Map manuscripts are passed on to the Cartographic Office for production of high quality colour printed maps. These maps are subsequently placed in envelopes as appendices of geological reports.

OBSERVATIONS

At present, nearly all of the Scientific Review Office activities are done manually, with the exception of typesetting. These are labour-intensive activities which result in the need to produce a very large volume of printed maps and text information at one time.

Consequently, there is a need for warehousing thousands of documents in finished product form to be subsequently disseminated. A very long period of inventory storage results, typically 10 to 50 years for documents. When documents go out of print, they can remain out of print either for years or forever. Therefore, there is a desire to institute a new process of "demand-printing" wherein it is possible to automate the complete composition process including text and graphic functions. This would allow the Office to take manuscripts in a variety of forms, automate them using several different types of tools, integrate the publication electronically and print one or more copies of that document upon request.

This type of total automation process has been tried successfully by the Office, which is currently in the process of requesting acquisition of several microprocessors, peripheral equipment, and software which would allow them to do this on an ongoing basis.

This Unit has plans for the acquisition of input equipment, data processing equipment for analysis and interfaces to service bureau output equipment for realizing the demand-printing concept. The input equipment involves three types of devices:

1. 16-bit microcomputers with word processor software for edit and insertion of typesetting codes in text associated with geological documents.

2. A scanning device such as a Xerox 150 which scans images, (i.e., photographs and maps using a raster scanner to create a digital facsimile at a service bureau where one pays by the scan).

3. A vector based digitizer which could be used for digitizing maps and graphs, typically found in any of these reports.

The processing equipment to which these devices would be linked includes a powerful microcomputer based on the Motorola 68000 chip which would operate integrated text typesetting software for automatic typesetting functions, visual display of the type which has been set on a low-resolution checking device, and integration of graphic information from graphic files. Operationally, this would function by allowing text to be loaded into a sequential page system with space created for subsequent digitial integration of graphics.

It is planned that a very basic computer-aided mapping system would also be loaded on this processor for generation of thematic and statistical maps. For example, maps for shading which show various geological types and have options for business-type graphics are desired.

The people interviewed had recently seen the GIMMS system at Statistics Canada, presently working in an operational cartographic mapping and display mode. They were impressed by its functionality and thought that it could be easily adapted to operate in this kind of a work environment.

It is envisioned that there will be an ability to generate tape or another type of electronic output media for the automatically typeset documents. This would then be sent to a service bureau or other organization with a high speed laser printer for generation of final output for each of the stored documents.

The Office would like to acquire the basic microprocessor and peripheral devices as soon as possible. They are also interested in acquiring one or more printers and up to 3 digitizing boards which would operate with multiple micros, for entry of their very large geologic maps and subsequent plotting of the maps. This is seen as a separate function from the automated publication system, but one which would be complementary, making use of identical equipment and software (with the exception of the digitizer board).

Currently, published products are distributed through the Ministry of Natural Resources Map Distribution Offices. A small nominal fee is charged for these documents, ranging from $2 to $5, to cover the cost of reproduction. The primary users of the data are aggregate and mining industries, universities, especially students, and industry consultants.

FUTURE NEEDS AND WANTS

The Scientific Review Office has a need for a variety of capabilities and equipment which will facilitate its mandate. A primary requirement is to have an extensive text processing capability which will facilitate the preparation, editing and production of reports. This facility is particularly relevant for realizing a "demand printing" concept for managing their extensive inventory.

The Unit also has need of a comprehensive geographical information system which is required for preparation and presentation of a wide variety of geological graphic products (maps, charts, drawings, etc.). Since many of the products are derived products and generalizations or abstractions of collected data, there is a need for considerable manipulation of the data using many G.I.S. tools.

G.I.S. POTENTIAL

This Unit, because of its mandate, is an ideal candidate for a G.I.S. system. As a manager of large volumes of geological information, it provides comprehensive reports and spatial representation which can ultimately be more effectively realized through an automated G.I.S. system. As the information base is expanded, an automated G.I.S. capability could become a generalized information source for co-ordinating all geological information associated with Ontario.

Some of the manual processes currently carried out by the Office which would benefit from automatic capabilities include: tabular data compilation, entry, update, storage and manipulation, cartographic data update, map join, edge match, storage, and display capabilities.

Text and bibliographic data management procedures would also be beneficial.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: PREPARATION OF GEOLOGICAL PUBLICATIONS

Scientific Review Office
MNR
77 Grenville Street
Toronto, Ontario

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS

TABULAR DATA

		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Preparation of edit	◐	◐	◐	◐	◐	□	□	□
	& copy for Geological								
	Publication								

CARTOGRAPHIC DATA — GENERATION / STORAGE

		GENERATION: COMPILATION	DIGITIZING/EDIT	CODO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE: STORAGE/MANAGEMENT
1	Preparation of edit	◐	□		◐	◐		◐
	& copy for Geological							
	Publication							

CARTOGRAPHIC DATA — MANIPULATION / ANALYSIS — GEOMETRIC ANALYSIS

		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Preparation of edit	□		□	□	□	□	□	□		□	□	□		□
	& copy for Geological														
	Publication														

CARTOGRAPHIC DATA — MANIPULATION / ANALYSIS — NETWORK ANALYSIS / DIGITAL TERRAIN MODELLING / QUERY

		NETWORK ANALYSIS: OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	DIGITAL TERRAIN MODELLING: SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	QUERY: SPATIAL QUERY	ATTRIBUTE QUERY
1	Preparation of edit				□	□					□	□	□	□	□
	& copy for Geological														
	Publication														

CARTOGRAPHIC DATA — DISPLAY

		COMPOSITION: QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	PRESENTATION: POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Preparation of edit	□	◐	◐	◐	◐	◐	◐	◐	□	◐
	& copy for Geological										
	Publication										

IMAGE DATA / TEXT DATA / BUSINESS GRAPHICS DATA / BIBLIOGRAPHIC DATA / REFERENCE TO DATA TYPES

		IMAGE DATA: COLLECTION	STORAGE	RETRIEVAL	TEXT DATA: ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	BUSINESS GRAPHICS DATA: ANALYSIS	DISPLAY	BIBLIOGRAPHIC DATA: INDEXING	STORAGE	RETRIEVAL	REFERENCE TO DATA TYPES
1	Preparation of edit	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	◐	
	& copy for Geological													
	Publication													

10.5 OUTDOOR RECREATION GROUP

The Outdoor Recreation Group is one of five groups comprising the Ministry of Natural Resources. This Group is responsible for managing Ontario's resources of fish, wildlife, provincial parks and recreation areas. To facilitate this mandate, three branches have been formed within the Outdoor Recreation Group. These are the Fisheries Branch, the Parks and Recreation Branch, and the Wildlife Branch.

The **Fisheries** Branch is composed of four sections: Client Services, Environmental Dynamics, Fish Culture and Fisheries Research. This Branch is responsible for:

(i) maintaining fish stocking information provided by fish hatcheries;
(ii) assisting the fish hatcheries with respect to production, co-ordination, planning and development of policy;
(iii) collecting and disseminating information throughout the Branch, other agencies and the public on commercial and noncommercial fishing in the province;
(iv) operating and maintaining the Ontario Fisheries Information System which maintains information on fish and fish habitat; and
(v) conducting research on fish and their habitats.

While the Ontario Fisheries Information System contains vast amounts of land-related information relevant to this study, it is not included in this study.

Through its three sections, Development, Operations, and Planning, the Parks and Recreation Branch:

(i) establishes and enforces policies, standards and guidelines pertaining to the management and operation of parks and recreation areas;
(ii) carries out environmental assessments with parks; and
(iii) establishes and maintains the infrastructure for parks and recreation areas such as roads, electric power and other facilities.

The Wildlife Branch is composed of five sections: Central Wildlife Services, Extension Development, Policy Development, Program Development, and Wildlife Research. These sections provide for the management, perpetuation and rehabilitation of wildlife resources in Ontario. To meet this responsibility the Branch:

(i) co-ordinates and carries out wildlife research;
(ii) develops and operates province-wide management projects involving moose, bear, small game and waterfowl;
(iii) establishes and enforces regulations concerning hunting within the province, as well as developing and co-ordinating policies affecting wildlife in general; and
(iv) operates a fur management program and provides related information and education to the public.

10.5.1 FISHERIES BRANCH

10.5.1.1 CLIENT SERVICES SECTION
RESIDENT AND NON-RESIDENT SPORT FISHERMEN SURVEYS

ORGANIZATION AND RESPONSIBILITIES

The Client Services Section collects and disseminates information to the Fisheries Branch, other agencies and the public on commercial and non-commercial fishing in the province. Information is provided through reports, publications and seminars. As one of three sections within the Fisheries Branch, Client Services has a staff of eight professionals, as well as several secretaries. This Section's activities include information dissemination, public education, information systems and commercial fish harvest information development and maintenance.

One of the land-related functions carried out by Client Services is the Resident and Non-Resident Sport Fishermen Survey. The cost of this survey is approximately $200,000, which is shared by the federal and provincial governments. The federal government subsidizes similar surveys in other provinces.

TASKS/SYSTEMS

1. Conduct Resident and Non-Resident Sport Fishermen Surveys

Client Services conducts a survey on Ontario's resident and non-resident sport fishermen every five years. The purpose of this angling survey is to evaluate the biological, economic and social impact of non-commercial fishing in the province. It is also used to help set policies at the district level. An economist in the Client Services Section oversees the execution of this survey. The last survey, taken in 1980, involved the mailing of a questionnaire to 40,000 Ontario residents. Approximatley 24,000 residents responded to the questionnaire. The type of information requested includes: the predominant location of fishing activity (i.e., the nearest town, and lake or river); identification of the species of fish caught, kept and eaten; the time spent fishing; and some additional economic data.

One of the problems experienced in the 1975 Sport Fishermen Survey involved the use of a map marked with grids attached to the questionnaire. Respondents were asked to mark the grid location on the map where the fishing was carried out. The locations as marked were not felt to be accurate enough and hence this method was abandoned. For the 1980 survey, the names of the lake or river and nearest town or village were requested.

The 1980 survey data received by Client Services was keypunched in a two-week period by four persons. The Ministry of Transportation and Communcations Code List was used by these persons to assign a geographic code to lakes, rivers, towns, and so forth. Once the data input process and subsequent analysis were completed, a report on the findings was published.

In addition to this major report compiled every five years, fifteen to twenty special reports are published annually utilizing the data obtained from the survey. The district levels may also carry out their own independent surveys on an annual basis.

OBSERVATIONS

This is but one of several data files maintained by the Fisheries Branch. The Branch is also currently developing an important system called the Commercial Harvest Monitoring System. This is intended to improve the present approach to monitoring the commercial fishing industry in Ontario. Presently, fishermen must complete a questionnaire on a monthly basis with the amount and type of fish caught, and on an annual basis, listing their capital investment in order to monitor the flow of capital in the fishing industry. Currently, there are 2,000 commercial fishing operations in Ontario. The information obtained is published and listed by major lakes, the men employed, boats, investments, and so forth.

FUTURE NEEDS AND WANTS

One of the long term objectives of the Client Services Section is to correlate this survey information with other data files maintained by the Fisheries Branch. An ability to perform on-line query of the data file is desired.

G.I.S. POTENTIAL

The Resident and Non-Resident Sports Fishermen Survey alone probably could not justify the use of a G.I.S. There does not appear to be a need for digital maps and the use of SPSS for statistical analysis appears adequate.

DATA SOURCE INFORMATION SHEET

TITLE: Resident and Non-Resident Sport Fishermen Survey

SOURCE AGENCY: Client Services

PERSON: Nilam Bedi

TITLE: Economist

ADDRESS: Room 2345
Whitney Block
Queen's Park

PHONE: (416) 965-7883

DESCRIPTION: A survey carried out every 5 years to evaluate the biological and economic impact of non-commercial fishing in the province

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	disk files
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: approximately 24,000 records

GROWTH RATE: N/A

DATA ITEMS: location - lake, river, nearest town
- species, number caught, kept & eaten
- time spent fishing
- economic data e.g. money spent

RETRIEVAL KEY(S): district, region, lake, species

GEOCODE: MTC Geographic Code for lakes, rivers, towns, villages, etc.

DATE OF CREATION: 1980

FREQUENCY OF UPDATE: every 5 years

COVERAGE/COMPLETENESS: the entire province

SOURCE OF INFORMATION: a questionnaire which is mailed to residents of Ontario and licensed sports fishermen outside the province.

USERS OF INFORMATION: mainly the district offices and the Fisheries Branch. It is also available to outside agencies and the public.

VOLUME/FREQUENCY OF USE: N/A

ACCESS METHOD FOR USER: through a published report and 15 to 20 special reports generated each year from information on the file

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: Queen's Park mainframe computer

SOFTWARE: SPSS for statistical analysis

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

one of the long term objectives of Client Services is to correlate this data with other data files maintained by the branch.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

Resident and Non-Resident Sport Fishermen Surveys

MNR

Outdoor Recreation Group

Fisheries Branch

Cleint Services Section

LEGEND:
- ○ MANUAL PROCESS
- ◉ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Sport Fishermen Survey	○	○		●	●	●	◉	●							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA																
		MANIPULATION / ANALYSIS																
		GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1	Sport Fishermen Survey																	

AGENCY FUNCTIONS		CARTOGRAPHIC DATA																				
		MANIPULATION / ANALYSIS											DISPLAY									
		DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION				
		SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Sport Fishermen Survey																					

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Sport Fishermen Survey													

10.5.1.2 FISH CULTURE SECTION

ORGANIZATION AND RESPONSIBILITIES

The Fish Culture Section is one of five sections within the Fisheries Branch. This Section is primarily responsible for:

1) maintaining fish stocking information in the province provided by 14 fish hatcheries;

2) assisting the 14 fish hatcheries in regard to the co-ordination, planning and development of policy; and

3) production planning for the 14 fish hatcheries.

These responsibilities are carried out by the Section's permanent staff of nine, who are supported by four contract biologists and a clerical staff of three.

TASKS/SYSTEMS

1. Gather and Maintain Fish Stocking Information

Data on fish stocking is received monthly from the fish hatcheries on coded forms, and is entered into computer files via keyboard. The data is used to generate approximately 15 to 20 reports for the hatcheries and fisheries officers in the 48 MNR districts. The information in the reports is used by the district offices to set district level policies regarding the fish stocking program. Some of this information is also provided to other sections within the Fisheries Branch.

The fish stocking file contains several geocodes, including latitude and longitude of the approximate centre of the lakes stocked, township name, watershed name and the Ontario Gazetteer name. Since lakes are often stocked by depositing fish in several different sites, the latitude and longitude given for the lake is not directly associated with the actual stocking location. Most computer reports on stocking site information are referenced to either MNR district, township or hatchery. When a special request is made, data is referenced by lake. Presently, there are about 1,100 yearly locations for stocking fish, which change on an annual basis.

Very little use is made of maps since the major portion of the stocking program is concentrated in several large lakes.

All software required for the generation of reports is programmed in the Section by in-house staff.

2. Planning and Development of Policy

In addition to providing information to the 14 fish hatcheries, the

Section also is responsible for developing certain policies and guidelines. These include specifications such as water temperature and other lake characteristics that the particular site should meet before it is used for the purpose of stocking fish. Policies set forth by this Section include the types of fish that can be raised by the private fish hatcheries, as well as recommendations for the operation of the fish hatcheries.

OBSERVATIONS

The Fish Culture Section is responsible for co-ordinating the allocation of fish among the 14 hatcheries within the province. This is done to ensure a balanced fish hatchery program.

The fish hatchery managers fill out forms which provide much of the data used by the Fish Culture Section for analysis. In certain instances, the information provided on the forms is incomplete or incorrect. The Section is currently developing a verification process to overcome this problem.

FUTURE NEEDS AND WANTS

Currently up to eight fields are used to determine a given location. The Fish Culture Section would like to reduce this to one field if possible. This would probably be an arbitrary index number.

G.I.S. POTENTIAL

Due to the nature of the tasks carried out by the Fish Culture Section, access to a G.I.S. would probably not result in a substantial improvement of their present services. However, mapping may be useful in some instances, such as showing provincial or regional distributions of stocking by species.

TITLE: Fish Culture

SOURCE AGENCY: Fish Culture, Fisheries Branch

PERSON: Douglas Farquhar

TITLE: Fish Culture Systems Specialist

ADDRESS: Room 2454
Whitney Block
Queen's Park

PHONE: (416) 965-7886

DESCRIPTION: Maintains fish stocking records and provides information for the coordination of district level hatcheries. It also provides information to other sections of the Fisheries Branch.

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	Disc file
IMAGE			
TEXT			
LIBRARY			

NOTE: Maps are not utilized.

SCALE:

ACCURACY/RESOLUTION: Latitude and longitude of centre of lake stocked.

SIZE/VOLUME: The file contains approximately 90,000 fish records (see DATA ITEMS).

GROWTH RATE: 1000 to 1200 records/year

DATA ITEMS: Monthly record of hatchery transfers and shipments for:

Fish Data - hatchery, destination and species.
Transportation Data - primarily cost data for transportation.
Distribution Data - location (see GEOCODE section).

RETRIEVAL KEY(S): Reports are generated from sorted sequential files. The output is by district, hatchery, year, lake name and great lakes.

GEOCODE: - latitude & longitude of lake centre
- watershed code, township, local name of location & official Gazetteer name, stocking site

DATE OF CREATION: 1947, 1980

FREQUENCY OF UPDATE: Disc file is updated on approx. a monthly basis from monthly record of transfers.

COVERAGE/COMPLETENESS: All lakes in the province involved in the program.

SOURCE OF INFORMATION: Fish hatcheries via coded form (once information is keyed into computer it is sent back to hatcheries for verification).

USERS OF INFORMATION: Primarily fish hatcheries, MNR district managers and other sections of the Fisheries Branch.

VOLUME/FREQUENCY OF USE: The information is used to produce reports 10-12 times a year.

ACCESS METHOD FOR USER: Primarily through the reports generated.

AVAILABILITY: Open

CHARGES: N/A

HARDWARE AND LOCATION: IBM 370 located at Queen's Park

SOFTWARE: Easitrieve

Programs are developed by section personnel (2 or 3 persons).

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

- Distribution data is often recorded inaccurately on forms prepared by the hatcheries. However, the Fish Culture Section is developing verification procedures to prevent this.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Fish Culture

MINISTRY: Natural Resources
GROUP: Outdoor Recreation
BRANCH: Fisheries
SECTION: Fish Culture

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Maintain staking records		●	●	●	●			●							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Maintain staking records														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Maintain staking records														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Maintain staking records										

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Maintain staking records													

10.5.2 PARKS AND RECREATION AREAS BRANCH

10.5.2.1 DEVELOPMENT SECTION PUBLIC HEALTH AND SANITATION UNIT

ORGANIZATION AND RESPONSIBILITIES

The main land-related responsibilities of the Public Health and Sanitation Unit are to monitor the water quality of bathing areas and those locations where drinking water is obtained in provincial parks. To this end, this Unit receives water quality analysis reports from the Ministry of Health's Laboratories which are in turn analysed by the Unit personnel. The Unit contacts the appropriate authorities in provincial parks if there appear to be problems of water contamination based upon these reports.

A staff of two carry out the responsibilities of this Unit.

TASKS/SYSTEMS

1. Water Quality Analysis and Sanitation Planning

Water quality samples in the provincial parks are obtained by the MNR district offices. These water quality samples are analysed by laboratories which are local to the sampling site. The tabular results of the water quality analysis are then sent from the laboratories to the Public Health and Environmental Sanitation Unit.

New provincial park development areas are evaluated for water supply and sanitary disposal. Prior to any park site development, a variety of analyses are carried out. For example, the soil types are sampled by a sanitary engineer from the Development Section prior to any construction or development of sanitary disposal areas; the Ministry of Health is contacted if any problems are found in the area and any additional analysis is supplemented by water quality and soils reports produced by the Ministry of the Environment.

Occasionally, aerial photographs obtained from the MNR Air Photo Library, Ontario Centre for Remote Sensing or industry under special contract are utilized by the Development Section, and particularly by the Public Health and Environmental Sanitation Unit. These assist in evaluating drainage patterns as part of the analysis process which is carried out in new park development areas prior to any actual construction of facilities or development.

The Public Health and Environmental Sanitation Unit works closely with the other units of the Development Section. In particular, this Unit works with park site facility designers in order to ensure that proper sanitation facilities are made available once the facility is in operation.

The specific water sampling sites in each provincial park are designated by unique numbers. These locations are shown and identified on maps of the areas of interest. An example of one such map is contained in the Appendix. Water quality samples are taken from these numbered sites located at drinking stations and beach areas several times a month. From June until September, approximately 5,000 bathing area water samples are taken from the 135 provincial parks in Ontario. The results of these analyses carried out on the water samples are filed in the Parks and Recreational Areas Development Section at the MNR.

Schematic maps and park layout plans are prepared by the Site Planning Unit of the Development Section. They are used by the Public Health and Environmental Sanitation Unit to display soil and water quality data from samplings taken from new park development areas.

OBSERVATIONS

Presently, comparisons between recent water quality samples and historical sampling data are being carried out by the Public Health and Environmental Sanitation Unit. These comparisons identify trends and expose any new or unexpected infiltration problems.

This Unit stores the analysis results on an in-house microcomputer. An example of the output from this system is contained in the Appendix. The codes and definitions used in this system are to be outlined in a manual being proposed. The data itself is stored on an Apple IIe microcomputer.

FUTURE NEEDS AND WANTS

This Unit would like to have an automated means for transferring the water analysis data from the district level to the Public Health and Environmental Sanitation Unit location at Queen's Park.

In addition to this capability, the Unit would find it desirable to have 1:2 000 scale maps with the contours of developed areas in provincial parks. These would show not only topographic information, but also facilities that exist or are proposed. It is felt that this information would be invaluable for sanitation planning.

G.I.S. POTENTIAL

Approximately 150 new provincial parks are projected to become operational in the future. For this reason, an efficient and automated means of collecting, analysing and maintaining the huge expected influx of water quality sample data from these areas would be useful to this Unit. Possibly, access to the Water Sampling Information System (SIS) maintained by the Ministry of the Environment at the Downsview Computer Centre may prove useful to this Unit for storing the analysis data. In addition, data already existing on the SIS may prove beneficial to the work carried out by this Unit.

The availability of a common base map produced at large scales would also be useful to the work carried out by this Unit. As previously outlined, this Unit utilizes information from other sections and ministries in the planning and investigation of sanitation facilities for new development sites in existing parks or new parks. If the other sections or ministries were using the same base map on which to place their information, the transfer of this information between these departments would be facilitated.

DATA SOURCE INFORMATION SHEET

TITLE: WATER QUALITY SAMPLING RESULTS

SOURCE AGENCY: Public Health & Environmental Sanitation Unit

PERSON: Mr. S. Cowan

TITLE: Environmental Sanitation Co-ordinator

ADDRESS:
Parks & Recreation Branch
Whitney Block, Room 3320
Queen's Park
Toronto, Ontario

PHONE: (416) 965-2745

DESCRIPTION: an automated file of water quality sample analysis results used for park site planning and monitoring purposes

FORMAT:

	M	A	MEDIA
MAP	x		schematic
TABULAR		x	disc
IMAGE			
TEXT			
LIBRARY			

NOTE: schematic maps show sample locations

SCALE: variable

ACCURACY/RESOLUTION: approximate sample locations

SIZE/VOLUME: 5,000 samples per year

GROWTH RATE: 5,000 samples per year

DATA ITEMS:
- sampler's name
- location by unique site number and park name
- date and type of location such as beach
- laboratory results of chemical or bacteria content

RETRIEVAL KEY(S): park name and site number identifier

GEOCODE: park name and numerical site identifier

DATE OF CREATION: unknown

FREQUENCY OF UPDATE: new samples are received on a weekly basis

COVERAGE/COMPLETENESS: all provincial parks in Ontario

SOURCE OF INFORMATION: sampling by MNR District Offices

USERS OF INFORMATION:
- Park staff
- Public Health & Environmental Sanitation Unit

VOLUME/FREQUENCY OF USE: constant use of data during vacation season

ACCESS METHOD FOR USER: tabular reports output from inhouse microcomputer

AVAILABILITY: open

CHARGES: N/A

HARDWARE AND LOCATION: Apple II inhouse microcomputer

SOFTWARE: user written in FORTRAN

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:
PROVINCIAL PARK WATER
QUALITY SAMPLE RESULTS
Public Health & Environmental
Sanitation Unit
Parks & Recreation Area
Branch, MNR

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Water Quality Analysis & Sanitation Planning	●	●	●	●	●	●	●	●

AGENCY FUNCTIONS		CARTOGRAPHIC DATA							
		GENERATION							STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	
1	Water Quality Analysis & Sanitation Planning	●							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS – GEOMETRIC ANALYSIS															
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS		
1	Water Quality Analysis & Sanitation Planning				●					●							

AGENCY FUNCTIONS		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING										QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING		SPATIAL QUERY	ATTRIBUTE QUERY
1	Water Quality Analysis & Sanitation Planning					□									●	●

AGENCY FUNCTIONS		DISPLAY – COMPOSITION					DISPLAY – PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Water Quality Analysis & Sanitation Planning							●			●

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Water Quality Analysis & Sanitation Planning								●	●				

10.5.2.2 OPERATIONS SECTION

RECREATIONAL AREAS UNIT
ACCESS POINTS

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Recreational Areas Unit is to establish guidelines and policies for the orderly siting, operation, maintenance and management of water access points on Crown lands. Secondary responsibilities include reporting on access points as required for such publications as the Minister's Annual Report, brochures and maps.

For the formulation of guidelines, the main activity is to develop standards and policy for specific problems which arise in the field. Such policies currently include standards for sanitation, garbage, closure (both temporary and permanent), and so forth. A new set of procedures and manual which outline standards for maps, publications and brochures is in the process of being developed by the Communication Services Branch.

TASKS/SYSTEMS

1. Reporting and Monitoring

In administering the access points program, the Recreational Areas Unit works in conjunction with the districts. Data is collected by the district parks staff, and includes the location of water access points and canoe routes which the district requires for access point management, as well as data not directly related to access points such as nature reserves, park boundaries and other data relevant to parks.

Data sources for this information include aerial photographs, field observations and existing access point maps with previous access point locations superimposed on them. The districts superimpose the data onto a base map. These maps are unique to each district and are designed to meet each district's needs.

Each district is responsible for producing its own maps or contracting for the production of the maps. The district maps are generally made from the 1:50 000 NTS map series, and are produced at a scale of 1 inch to 2 miles or on district administrative maps. The data is manually superimposed onto the base. Access point information is supplied by the districts to the Recreational Areas Unit on request. Generally, the Unit phones the districts and requests information regarding access points on an ad hoc basis. The Recreational Areas Unit does not keep a record of the access point information.

The maps are not generally distributed. The public has access to the maps through display at the local district office. The districts use the maps for work planning and management purposes.

2. Problem Solving

When problems are identified in monitoring reports, the staff makes efforts to provide solutions. For example, when a given canoe access point is overpopulated, another may be sited nearby to alleviate the problem.

3. Formulation of Policy/Standards

The Unit recognizes the need for data standards, and is working towards developing such standards within the Ontario Provincial Parks and Recreational Areas System.

OBSERVATIONS

The information collected and plotted on maps is of limited use because of the inaccuracy of the base and the lack of scope in coverage. This could be overcome if proposed data standards are adopted.

A recent Access Points Subcommittee recommendation has stated that information such as water access points is subject to change over a short period of time and should therefore be left off the access point maps. This recommendation is aimed toward avoiding incidences in which citizens receive outdated maps and attempt to use access points which no longer exist.

G.I.S. POTENTIAL

The availability of base and thematic data in digital format could be useful for a variety of spatial analyses including:

1) correlation of recreational activities with canoe routes,
2) analysis of traffic patterns for canoe routes, and
3) usage of access points for camping, picnicking, boating and fish and wildlife sports.

The spatial distribution and inventory of access points could be more effectively maintained in an automated system since updates on openings and closures of water access points could be done on-line. This would offer accurate and current records to the park authorities and facilitate the Recreational Areas Unit's role in controlling and monitoring access points.

Specific G.I.S. capabilities which would be applicable in using the park access points inventory include: point in polygon searches to determine where access points exist or are needed, windowing to identify interest areas, line length calculations to determine distances between access points and areas of interest for planning purposes, as well as flow simulation and query, also for planning and determining access point locations.

DATA SOURCE INFORMATION SHEET

TITLE: PARK ACCESS POINT INVENTORY

SOURCE AGENCY: District Offices

PERSON: Brian C. Huis
TITLE: Technician,Recreational
ADDRESS: Whitney Block, Areas
Queen's Park
Toronto, Ontario

PHONE: (416) 965-1245

DESCRIPTION: district map on which access point,canoe information is superimposed

FORMAT:

	M	A	MEDIA
MAP	x		
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1":2 miles

ACCURACY/RESOLUTION:

SIZE/VOLUME: varies annually; approximately 900 access points

GROWTH RATE: -40

DATA ITEMS: access points, provincial parks, canoe routes, nature and park reserves

RETRIEVAL KEY(S): district map

GEOCODE: district

DATE OF CREATION: 1981

FREQUENCY OF UPDATE: annually

COVERAGE/COMPLETENESS: provincial parks in Ontario

SOURCE OF INFORMATION: provincial parks

USERS OF INFORMATION: internal to parks and recreation for input into public brochures and publications

VOLUME/FREQUENCY OF USE: N/A

ACCESS METHOD FOR USER: brochures

AVAILABILITY: maps not available

CHARGES: N/A

HARDWARE AND LOCATION: file cabinets at the district offices

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

not highly accurate information; each district has their own map, therefore, no standards across province

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: PARKS ACCESS POINTS INVENTORY

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA: GENERATION						CARTOGRAPHIC DATA: STORAGE
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Reporting/monitoring				◐		◐									
2 Problem solving					◐										
3 Formulation of policy/standards		□	□	□				□							

AGENCY FUNCTIONS	CARTOGRAPHIC DATA: MANIPULATION / ANALYSIS: GEOMETRIC ANALYSIS													
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Reporting/monitoring														
2 Problem solving														
3 Formulation of policy/standards				□			□			□				

AGENCY FUNCTIONS	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Reporting/monitoring														
2 Problem solving														
3 Formulation of policy/standards		□											□	□

AGENCY FUNCTIONS	DISPLAY: COMPOSITION					DISPLAY: PRESENTATION					IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Reporting/monitoring																							
2 Problem solving																							
3 Formulation of policy/standards	◐				◐	◐	◐	◐		◐													

10.5.2.3 PLANNING SECTION

OVERVIEW

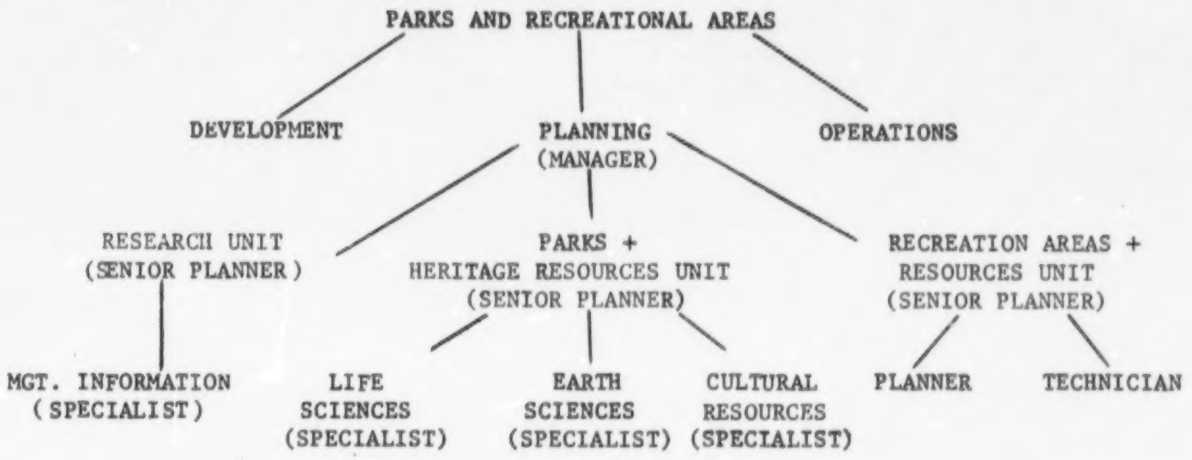
The Planning Section is responsible for undertaking research projects which involve collecting, analysing and maintaining data that will be utilized to:

1. develop options for provincial parks and recreational areas, and policy strategies to meet provincial goals and objectives, e.g., park systems and master plans;
2. develop provincial parks plans and management guidelines, procedures and standards within the framework of stated provincial policies and accepted provincial parks policies;
3. recommend priorities for recreational land acquisitions;
4. monitor park and recreational area user perceptions and attitudes;
5. analyse recreation supply and demand;
6. provide inter-agency liaison;
7. promote development of complementary park facilities; and
8. advise individuals, firms, municipalities, organizations and agencies on park and recreational development.

The Planning Section has been divided into three units: Research, Parks and Heritage, and Recreation Areas and Resources. Each of these units and their activities will be described in the sections which follow.

The responsibilities of this Section are fulfilled by a staff of twelve including support personnel. A chart of the structure of the organization is presented in Figure 10.5.2.3-A.

FIGURE 10.5.2.3-A


PARKS AND RECREATIONAL AREAS
DEVELOPMENT
PLANNING (MANAGER)
OPERATIONS
RESEARCH UNIT (SENIOR PLANNER)
PARKS + HERITAGE RESOURCES UNIT (SENIOR PLANNER)
RECREATION AREAS + RESOURCES UNIT (SENIOR PLANNER)
MGT. INFORMATION (SPECIALIST)
LIFE SCIENCES (SPECIALIST)
EARTH SCIENCES (SPECIALIST)
CULTURAL RESOURCES (SPECIALIST)
PLANNER
TECHNICIAN

10.5.2.3.1 RESEARCH UNIT

ORGANIZATION AND RESPONSIBILITIES

The Research Unit collects park-related data and carries out statistical analysis on park use and park facilities in the Province of Ontario. In addition to analysing these data, the Unit also maintains a data base of the collected and analysed data which are made available to other organizations. Two activities which fall within their mandate are the Park User Survey and the Ontario Recreation Supply Inventory.

TASKS/SYSTEMS

The following is a description of the land-related tasks undertaken by this Unit:

1. Surveying Park Users

A survey is conducted annually for specific parks to ascertain information relevant to park operations. Each of the approximately 135 provincial parks in Ontario are surveyed once every five years. In any given year, 20 to 30 individual parks are surveyed. This information is derived from a questionnaire designed by the Research Unit and given selectively to a sample of park users. While the number of questionnaires handed out at any particular site is dependent on the volume of park users, usually about 1,000 questionnaires will be handed out with the expectation of a 30% response rate. The general contents of the questionnaires consist of a set of questions that is common to all park areas, and other questions which may be relevant to particular locations.

The questionnaire responses are gathered by the parks offices which send the information directly to the head office. The Unit compiles all the survey data and enters it into a digital file on the Queen's Park IBM mainframe via formatted screen programs accessible through an in-house terminal. Some locational information is recorded using the Ministry of Transportation and Communications geocodes (which are site-oriented). Standard reports are generated using the SAS package. These are distributed to the Parks Branch staff to Parks Field Offices, throughout the Ministry of Natural Resources and the Ministry of Tourism and Recreation, as well as being available to other interested groups. Figure 10.5.2.3.1-A presents the process which is undertaken by this Unit to produce the final reports.

The results of the park user survey help the Branch to plan, develop, and manage park areas within the Province of Ontario. Some specific results of this survey include the origin of park users; active participation within the park; and trends involving park users such as the length of stay in the park and whether the parties that are using the parks are getting larger or smaller. A separate questionnaire is provided to the day users of the park areas and to those who are staying for periods longer than a day (i.e., campers). A copy of a questionnaire is contained in the Appendix.

PARK USER SURVEY

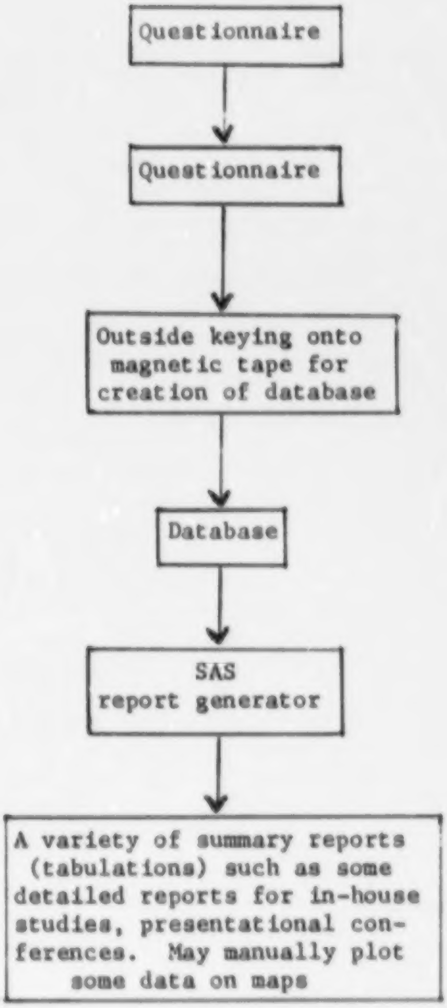

Questionnaire
Questionnaire
Outside keying onto magnetic tape for creation of database
Database
SAS report generator
A variety of summary reports (tabulations) such as some detailed reports for in-house studies, presentational conferences. May manually plot some data on maps

Figure 10.5.2.3.1-A

2. Maintain Ontario Recreation Supply Inventory

The inventory was initiated as a result of a demand/participation survey undertaken in 1973 and 1974. This survey determined what people do at the recreational sites, as well as how they travel to the sites and other pertinent data. It was felt at that time that a facilities survey was required in order to determine whether adequate facilities were available to meet the needs of the recreation site users.

This inventory survey was first undertaken by the Planning Section to obtain quantitative data on the recreational supplies and facilities that exist on the approximately 18,000 recreational sites in Ontario. The Research Unit of the Planning Section helped carry out this survey, compile and analyse the data as well as maintain and distribute the results. An update of the original survey was undertaken between the years of 1977 and 1981. Since this last inventory, only occasional updating has taken place.

A recreation site in Ontario can be owned and/or operated by any of the four levels of government, and be a private, commercial or institutionally operated site. Services offered by these recreational sites are categorized under one or more of 16 activities, which include camping, boating, swimming and fishing.

There are approximately 72,000 records maintained on the Queen's Park computer that describe the recreational sites and provide a listing of the various acitivies and facilities available on the sites. In addition to this, the sites located in Southern Ontario are plotted on NTS 1:50 000 maps and 1:25 000 maps (for those sites located near urban areas). Specifically, a site code is shown on the map which consists of a sequential number identifying the particular recreation site in a particular county. The maps that are utilized are on Mylar base and produced by the federal government according to the specifications provided by the Planning Section. In particular, specific features and contours have been deleted from those maps covering Southern Ontario. In all, approximately 300 maps which cover Southern Ontario are utilized by this Section to display the site codes of the recreation sites.

Information residing on the data base that is accessible through the in-house terminal is usually used three times a week. The major retrieval keys for the inventory data are the county, township, and NTS map number.

The organizations that make use of this data include the Parks and Recreational Areas Branch for developing their own master plans as well as marketing plans; conservation areas for the purpose of defining development potential for watershed areas; municipalities for the development of their own official plans and daily planning needs; the field offices of the Branch as well as consultants who liaise with these outside organizations, and the Parks and Recreational Areas Branch.

OBSERVATIONS

The use of maps is not central to the operation of the park user survey. Occasionally, some of the information is displayed on small scale maps illustrating, for example, the origin of the park users in Northern and Southern Ontario. This type of map is used for facility and location planning.

There is a link between the Ontario Recreation Supply Inventory and the provincial parks for which the park user surveys are undertaken. In a provincial park there may be several recreation sites. For example, in Algonquin Park one site may offer strictly camping facilities, while another site may provide camping, swimming, fishing and boating facilities. For this reason, when analysing the park user survey results, it is not uncommon to access the Recreation Supply Inventory data to see, among other things, whether the services and facilities available are adequate to meet the needs of the park users. The needs are derived from the park user questionnaire.

The Research Unit of the Parks Section may also be approached by the government agency responsible for BILD (Board of Industrial Leadership and Development) in order to provide information for sites being considered for grants under the BILD program. The Research Unit also provides some input through the Parks Assistance Act as the funding that should be made available to various parks. The information available through the data base is used to help develop a recommendation by this Unit.

FUTURE NEEDS AND WANTS

In order to improve the response rate to the park user survey questionnaire and save the time of park staff in carrying out this survey, it has been suggested that microcomputers be set up in brightly coloured kioks located in the park/gate offices. This aproach may attract the attention of the park area users and encourage their participation in the survey. It is hoped that the usage of the microcomputer terminal to respond to the questions of the survey would instill some interest on the part of the park user.

Since the maps of recreational sites have proven useful for the Ontario Recreation Supply Inventory, it is felt that they should be updated. However, due to lack of resources the Unit has not been able to undertake this task. This Unit would also benefit from a better analysis capability which would help in its recommendations in regard to funding from the BILD program and the funding available through the Parks Assistance Act.

G.I.S. POTENTIAL

The Research Unit makes use of NTS base maps for the Ontario Recreation Supply Inventory and associated data base. Information from this inventory in both graphic and non-graphic format has proven useful in regard to supply analyses. For this reason, a data base that would encompass both sources of information or provide automated links between the two sources of information as well as to the available maps may improve the service delivery of this Unit.

Other sections within the Ministry of Natural Resources and other departments that make use of park or recreational site-related data would also find it useful to access this information via automated means and have the data plotted on a common base map. Due to the additional 155 parks that are expected to become operational, this Unit would benefit from additional data manipulation and analysis capabilities in regard to the park user surveys, as well as the supply and facilities inventory data.

Particular automated procedures which would benefit this Unit include cartographic data updating, address geocoding, storage and management, as well as point in polygon searches, spatial and attribute queries, cosmetic enhancement, graphic superimposition, and polygon and point mapping with annotation of text.

DATA SOURCE INFORMATION SHEET

TITLE: Park User Survey

SOURCE AGENCY: Research Unit
PERSON: Donald E. Hallman, Ph.D.
TITLE: Senior Research Planner
ADDRESS: Planning Section
Parks & Recreation Branch
Whitney Block
Queen's Park, Toronto, Ontario
PHONE: (416) 965-3981

DESCRIPTION: a survey of park users in Ontario

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	disc, tape
IMAGE			
TEXT			
LIBRARY			

NOTE: information is sometimes placed on OBM & NTS maps
SCALE: NTS: 1:50,000
OBM

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: 132 parks in Ontario
1,000 records per year per park surveyed
GROWTH RATE: 1,000 records per year per pak surveyed
DATA ITEMS: park identification and park user statistcis such as number of park users in group, their ages and sex; number of days spent in park; activities; expenditures

RETRIEVAL KEY(S): N/A

GEOCODE: park name and code
residential location code both based on MTC 5 digit code

DATE OF CREATION: 1976

FREQUENCY OF UPDATE: annually

COVERAGE/COMPLETENESS: all 132 parks in Ontario which are all surveyed in a 5-year cycle
SOURCE OF INFORMATION: park user survey questionnaire

USERS OF INFORMATION: MNR, Ministry of Tourisme and Recreation

VOLUME/FREQUENCY OF USE: as required for planning;
- reports are produced annually

ACCESS METHOD FOR USER: through reports generated by a report generator

AVAILABILITY: limited

CHARGES: none with limited access

HARDWARE AND LOCATION: IBM mainframe at Queen's Park

SOFTWARE: Mark IV Report Generator

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: Ontario Recreation Supply Inventory

SOURCE AGENCY: Parks and Recreation

PERSON: Mr. G.D. Driscoll

TITLE: Management Information Specialist

ADDRESS: Whitney Block, Room 3352
Queen's Park
Toronto, Ontario

PHONE: (416) 965-3981

DESCRIPTION: a catalogue of all public and private recreation sites in Ontario

FORMAT:

	M	A	MEDIA
MAP	x		NTS mylar
TABULAR		x	disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: NTS maps 1:50,000
1:25,000

ACCURACY/RESOLUTION: site specific

SIZE/VOLUME: 18,000 sites
approx. 72,000 records

GROWTH RATE: marginal

DATA ITEMS: activities and facilities available by site such as
- tennis
- swimming
- track and field, and
- equestrian facilities

in total, 16 categories for activities and facilities

RETRIEVAL KEY(S): batch retrieval sorting by county, township and map number.
These are the major retrieval keys

GEOCODE: UTM co-ordinate
site code
NTS map number

DATE OF CREATION: 1974

FREQUENCY OF UPDATE: occasional as new information becomes available

COVERAGE/COMPLETENESS: all recreation sites in Southern Ontario

SOURCE OF INFORMATION: owner/operators of recreation sites

USERS OF INFORMATION:
- all levels of government for planning recreation sites for an area
- conservation authorities
- consultants
- and those private organizations wishing to develop a recreation site

VOLUME/FREQUENCY OF USE: the information is accessed approximately 3 times per week

ACCESS METHOD FOR USER: batch processing for reports. Access throughout in-house terminal

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: IBM at Queen's Park computer facilities

SOFTWARE: Mark IV report generator

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

10.5.2.3.2 PARKS AND HERITAGE UNIT RECREATIONAL AREAS AND RESOURCES UNIT

ORGANIZATION AND RESPONSIBILITIES

The **Parks and Heritage Unit** is responsible for establishing standards and guidelines for inventories of natural and cultural features. Inventory information collected to date has been used to identify candidate provincial parks and Areas of Natural and Scientific Interest in district land use planning in relation to parks system planning. The data is also used in provincial parks management planning, and other purposes such as plan input and review. The Unit maintains a comprehensive provincial data base for earth science and life science areas and has a more limited data base for cultural features.

The responsibilities of the **Recreation Areas and Resources Unit** are to ensure that the legal fabric of the provincial parks are properly described and mapped. In addition to this, the Unit helps prepare policies in regard to the opportunities that may exist for the potential recreational use of provincial Crown lands. To this end, this Unit works closely with the Parks and Heritage Resources Unit.

TASKS/SYSTEMS

1. Park Systems and Management Planning

The primary responsibilities of this Unit are focused on system planning and management planning for provincial parks and Areas of Natural and Scientific Interest.

Systems planning is undertaken to identify provincial parks and Areas of Natural and Scientific Interest to fulfill the goals and objectives of the Ministry with respect to the identification and protection of the province's natural and cultural heritage. As part of systems planning, targets have been established and inventories conducted to identify candidate areas. The data was incorporated in district land use planning which in turn lead to the eventual designation of 155 recommended provincial parks and 600 Areas of Natural and Scientific Interest.

Park management planning is undertaken to establish policies to co-ordinate and provide long term direction for the management and development of individual parks and Areas of Natural and Scientific Interest. In this respect the Unit is responsible for developing policies to guide the management planning process and also to provide guidance with respect to earth and life sciences and cultural features. The planning of provincial parks and Areas of Natural and Scientific Interest is described in more detail in the following section.

a) Planning and Maintaining Maps for Provincial Parks

At present, there are 139 provincial parks in regulation. The Parks and Heritage Unit is responsible for developing policies for management plans to guide the long term management and development of these parks. With direction provided by these policies, regions and districts are responsible for preparing management plans. They are subsequently reviewed by the Unit to ensure consistency with planning and management policies.

In association with management planning, the Unit has established standards for inventories of natural and cultural resources which provide data for the subsequent formulation of management planning policies. It also provides expertise to the field concerning appropriate management strategies for natural and cultural resources.

The Unit maintains a data base for natural and cultural features within provincial parks. In so doing, it monitors those features which have received recognition and protection through designation as nature reserve and historical zones.

b. Establishing Areas of Natural and Scientific Interest (ANSI) and Maintaining Data

Areas of key biological and environmental interest exist within the province but are not located in the provincial parks system. Nevertheless, due to their importance, they require consideration and safeguarding. To this end, the ANSI program is currently being developed but is not yet operational.

The Areas of Natural and Scientific Interest may be located on either Crown lands or private lands. To help preserve those areas on private lands, it is expected that special easements or zoning areas will be established through the appropriate level of government (such as the municipal level) to constrain or halt any possible future development on these lands. For areas located in the provincial parks, special zones may be designated so that an ANSI may be protected from development which may harm it.

Approximately 380 areas within the province have been identified as being of natural and scientific interest. These areas were designated to protect representative and unique landscapes across the province. The process of establishing these areas started with a survey of existing provincial parks. Those located within parks will be zoned as nature resources or wilderness. In addition to surveying the existing parks, other public and private lands were investigated to complete the inventory of ANSI.

Once an area of natural significance has been identified, it is then described and plotted on maps. There are approximately 2,000 sheets containing descriptions on the physical and biological aspects of these sites. Accompanying these descriptions are maps showing the location and extent of the site boundaries. A typical map included with these descriptions would be a portion of an NTS 1:50 000 map with a large scale schematic plot highlighting certain features on the site.

The information on these sheets describes the location of the site and includes: the site's name, the county, township, concession and lot in which it is located, the ownership of the land on which the site is located, the latitude and longitude of the approximate centroid of the site along with its UTM co-ordinate values, the MNR administrative and forestry region and district, as well as the identification of any aerial photographs of the area.

An estimated 2,000 site descriptions are filed in filing cabinets by the NTS 1:50 000 map sheet numbers. The sites are filed by map sheet number, and sequentially by the approximate co-ordinate values of the sites in question.

Registry Office searches are required to obtain the necessary ownership and site boundary information. At present, the Unit has a staff of four, which include a historian, a geologist, a biologist and the Unit head. Where there is sufficient expertise at the district level, the necessary information is collected through the district office. However, where this expertise does not exist, the Unit's staff members work directly with the regional offices to collect necessary information. At present, the growth rate of these sites is marginal, and the tasks mainly involve determining protective options and managing the sites identified rather than finding new sites.

The users of the information collected by the Parks and Heritage Unit are many and varied. For example, the Ministry's district level planners will consult this information when reviewing plans of subdivision. They are used for management planning in regard to fish and wildlife. Ontario Hydro will ask the Unit for information when it is carrying out transmission corridor studies and requires information on any parks or sites that may be on the proposed route. This information is also utilized by the planners of municipalities, consultants, and used for waste management studies. In general, it is estimated that this Unit and other sections and organizations access and use this information on a daily basis.

c. Maintenance of Cultural/Historical Sites Information

The information maintained by this Unit on cultural and historical sites is not nearly as complete as the information on the Areas of Natural and Scientific Interest. The major reason for this is that the mandate for this responsibility lies primarily with the Ministry of Citizenship and Culture, which has an extensive inventory of such sites. While the Ministry of Citizenship and Culture deals primarily with those sites located on private lands, this Unit deals with those cultural resources found in the provincial parks. Under this category of cultural and historical sites, there are now three designated historical parks. To avoid any duplication, this Unit attempts to integrate the information that it collects with the inventory of sites maintained by the Ministry of Citizenship and Culture.

OBSERVATIONS

This Unit works closely with the Recreaction Areas and Resources Unit in the Planning Section and the Surveys and Drafting Sections of the Surveys and Mapping Branch to produce plans showing the legal fabric of the 139 provincial parks in the province. The general process to produce these plans is as follows. The area is identified; preliminary boundaries are defined and ownership is verified and legal descriptions are prepared. The park is then regulated by Order-in-Council under the Provincial Parks Act.

The description is filed in the appropriate regional office of the Ministry of Natural Resources and the Planning Section Office.

Currently, a number of maps are being utilized to plot the boundary information of the parks. These include the NTS 1:50 000 maps, county maps at the scale of 1" = 4 miles as well as OBM maps where they are available. In addition to these, approximately thirty 1:1 000 000 scale maps are used to show the distribution of the provincial parks as well as the Areas of Natural and Scientific Interest in the province. A number of overlays also exist for these small scale maps that show information such as biological and geological features and areas of interest.

In an effort to speed up the process of accessing data within the manually kept files, the Parks and Heritage Unit is developing a data base on an Apple microcomputer. This data base would contain a variety of data on the Areas of Natural and Scientific Interest. In order to make this data base as useful as possible, it is envisioned that there will be considerable flexibility in the use of retrieval keys for this stored data.

FUTURE NEEDS AND WANTS

Data available through other sections of the Ministry of Natural Resources as well as other ministries would prove useful to this Unit and the Planning Section in general. The ability to have ready access to this information such as biological, geological and ownership data would enhance the Planning Services provided by the Unit. It has been suggested that automated plotting and graphic information overlay capabilities would be useful in the studies carried out by this Unit and others regarding the provincial parks and recreation sites.

G.I.S. POTENTIAL

The basic planning and data maintenance responsibilities of this Unit make it necessary to access a variety of both graphic and nongraphic information from a number of departments at the provincial level. A means of readily accessing this information and the ability to overlay this information in graphic format would be of great advantage to this Unit and the Planning Section in general. To this end, a standard or common referencing mechanism for the information would be beneficial, as well as the availability of a digital map base on which this data could be plotted.

A broad range of data management procedures would be beneficial to this Unit. For the maintenance of natural and historic site records, tabular data entry, storage and management, on-line query and report generation would be used in handling and producing these data as needed. Various cartographic tools for update, storage, line length calculation and contiguity analysis, query, display, and image storage/retrieval would also be useful.

The maintenance of provincial park maps would also benefit from the availability of certain cartographic data management tools, including generation, storage, analysis, query, display and text handling procedures.

DATA SOURCE INFORMATION SHEET

TITLE: Cultural/Historical Sites

SOURCE AGENCY: Parks and Recreation
PERSON: Mr. R. Davidson
TITLE: Geologist
ADDRESS: Whitney Block, Room 3349
Queen's Park
Toronto, Ontario

PHONE: (416) 965-3981

DESCRIPTION: a manual inventory of site descriptions and maps of natural, cultural and historical sites in the province

FORMAT:

	M	A	MEDIA
MAP	x		paper
TABULAR	x		paper
IMAGE			
TEXT	x		paper
LIBRARY			

NOTE: NTS maps @ 1:50,000 & 1:25,000 are utilized

SCALE:

ACCURACY/RESOLUTION: individual sites

SIZE/VOLUME: 2,000 records

GROWTH RATE: marginal

DATA ITEMS:
- site description
- site name
- owner
- map showing geology and vegetation

RETRIEVAL KEY(S): site name

GEOCODE: UTM co-ordinates
latitude & longitude
address (township, concession and lot)

DATE OF CREATION: unknown

FREQUENCY OF UPDATE: continuous, as new sites are designated

COVERAGE/COMPLETENESS: all provincial historic sites

SOURCE OF INFORMATION: field studies by Parks and Recreation staff

USERS OF INFORMATION: MNR regional offices
- Ontario Historical Foundation
- Ministry of Transportation and Communications

VOLUME/FREQUENCY OF USE: daily

ACCESS METHOD FOR USER: request by mail, telephone

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: manually kept files located in Room 3349, Whitney Block

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
currently developing a mini data base on 'Apple' computer utilizing the PFS software package

DATA SOURCE INFORMATION SHEET

TITLE: Provincial Park
Maps and Legal Descriptions

SOURCE AGENCY: Parks and Recreation

PERSON:

TITLE:

ADDRESS: Whitney Block, Room 3349
Queen's Park
Toronto, Ontario

PHONE: (416) 965-3981

DESCRIPTION: a manually kept inventory of maps displaying the legally recognized boundaries of the provincial parks in Ontario, together with metes and bounds descriptions where applicable

FORMAT:

	M	A	MEDIA
MAP	x		paper, mylar
TABULAR			
IMAGE			
TEXT	x		paper
LIBRARY			

NOTE:

SCALE: various

ACCURACY/RESOLUTION: accepted drafting accuracy standards

SIZE/VOLUME: approximately 137 maps

GROWTH RATE: marginal at present

DATA ITEMS:
- legally recognized boundaries of the provincial parks
- natural and man-made features

RETRIEVAL KEY(S): park name

GEOCODE:

DATE OF CREATION: unknown

FREQUENCY OF UPDATE: as new parks are created or boundaries of existing parks change

COVERAGE/COMPLETENESS: all provincial parks in Ontario

SOURCE OF INFORMATION: Registry Office

USERS OF INFORMATION: Parks and Recreation as well as other interested organization

VOLUME/FREQUENCY OF USE: occasional

ACCESS METHOD FOR USER: through manual files

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: flat files located at Parks and Recreation office

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Parks and Recreation Branch Planning Section

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA: GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Maintaining Park User Survey Data	◐	◐	◐	◐	◐	◐	◐	◐							
2	Maintaining Ontario Recreation Supply Inventory	○	◐	◐	◐		◐	◐	◐				◐		◐	◐
3	Maintaining Natural/ Historic Site Records	○	◐	◐	◐			◐	◐	◐			◐			◐
4	Maintaining Maps of Provincial Parks (drafting carried out by Drafting Section)									◐		◐	◐	◐		◐

AGENCY FUNCTIONS		MANIPULATION / ANALYSIS: GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1	Maintaining Park User Survey Data																	
2	Maintaining Ontario Recreation Supply Inventory				◐													
3	Maintaining Natural/ Historic Site Records				◐							◐			◐			
4	Maintaining Maps of Provincial Parks (drafting carried out by Drafting Section)	◐								◐	◐	◐			◐			

AGENCY FUNCTIONS		DIGITAL TERRAIN MODELLING									QUERY		DISPLAY: COMPOSITION					PRESENTATION				
		SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Maintaining Park User Survey Data																					
2	Maintaining Ontario Recreation Supply Inventory										◐	◐				◐	◐	◐	◐			◐
3	Maintaining Natural/ Historic Site Records										◐	◐	◐	◐	◐	◐	◐	◐	◐	◐		◐
4	Maintaining Maps of Provincial Parks (drafting carried out by Drafting Section)										◐	◐		◐	◐	◐	◐	◐		◐		◐

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Maintaining Park User Survey Data													
2	Maintaining Ontario Recreation Supply Inventory													
3	Maintaining Natural/ Historic Site Records		◐	◐										
4	Maintaining Maps of Provincial Parks (drafting carried out by Drafting Section)				◐	◐	◐	◐						

10.5.3 WILDLIFE BRANCH

10.5.3.1 CENTRAL WILDLIFE SERVICES SECTION

10.5.3.1.1 FUR MANAGEMENT UNIT

ORGANIZATION AND RESPONSIBILITIES

The primary responsibilities of the Fur Management Unit are:

1. to co-ordinate the provincial fur management program,
2. to provide information and advice to trappers and MNR district officers regarding the harvest of fur-bearing animals in the province, and
3. to provide harvest and biological information to other sections in the Wildlife Branch as well as other organizations, regarding soil research and environmental impact studies.

These responsibilities are carried out by a staff of two consisting of the program co-ordinator and one clerk. The total annual budget of this program is approximately $130,000, of which $30,000 is for computer usage, $40,000 for general administration and the remainder for the staff's salary.

TASKS/SYSTEMS

The primary land-related tasks of this Unit are as follows:

1. to prepare reports on the harvest of fur-bearing animals in the province,
2. to monitor the harvest of fur-bearing animals in the province,
3. to help carry out aerial beaver surveys, which are usually done at the district level, and
4. to maintain registered maps of traplines and private lands fur management areas.

1. Production of Reports

The Unit prepares approximately 15 to 20 reports annually. These are sent to the MNR district offices where harvest quotas are set and licences are issued. Several of the major reports that are generated by this Unit include: Fur Harvest Reports by geographic area, Trapper Alphabetical Reports, Fur Harvest Reports, and Maintenance Listing by District Reports.

Most of the reports are generated through the use of the Queen's Park computer. Examples are contained in the **Appendix**. The data utilized for these reports originate from MNR and the Ontario Trappers Association. This is the same data that is used in the monitoring program described in the following section.

2. Monitor the Harvest

To ensure that a balanced harvest program is maintained (i.e., that fur-bearing animals are not being overharvested), the Unit monitors trapping activity in the province. In order to carry out this task, the Unit relies on data provided by the Ministry of Natural Resources and the Ontario Trappers Association along with other fur dealers.

The data from the Ministry is obtained from information recorded on the trapping licences, Sealing Reports and the Fur Dealers Purchase and Sales Reports. Information with respect to royalties to be received by the province on the sale of raw pelts is obtained from export and tanning permits.

The trapping licence that is issued at district level contains the following data: trapper's assigned number, name, address, age, animal quota, trappers status and area (lot, concession, township), and land area. The trapper's assigned number is a 10-character geocode which provides the following information:

MNR district - 2 characters
officer patrol area or private lands fur management unit - 2 characters
trappers type - 1 character
trapline or township - 3 characters
unique trapper - 2 characters

The Sealing Reports, which are another method for controlling the harvest and sale of furs, contain the trapper's assigned number, his name, date and the type and number of pelts sealed per species caught. All pelts, except muskrat, must be sealed before they can be sold.

In addition to this information, the Fur Management Unit periodically receives pelt size and pelt quality data from the Ontario Trappers Association. Sales reports by trapper come in the form of the Fur Dealer Purchase Reports and contain the trapper's assigned number, his name, date and the number and type of pelts reported in addition to other information.

The data provided by the Ministry of Natural Resources and the Ontario Trappers Association is availabe on computer magnetic tapes. This data resides on the Queen's Park computer and is accessed by the Fur Management Unit via batch processing.

Approximately six million items of fur harvest data are stored in the computer. This consists of identification and quota information on the 18,000 registered trappers in Ontario and information on the one million fur-bearing animals captured annually in the province.

Maps are occasionally produced to assist the Fur Management Unit in monitoring the harvest within the province. For this purpose the fur harvest data is manually aggregated from the computer-generated reports if it is not in the required format and placed on small scale maps of the scale of 1:250 000 and 1:1 000 000. Typical plots include the placement of traplines on 1:250 000 map sheets, type of animal trapped, the number of animals trapped by trapline and by township, and the size and grade of pelts.

3. Conduct Aerial Beaver Surveys

This is an activity of the commercial wildlife program and is provided on an "as required basis" and done in the districts. Its purpose is to provide the location of beaver colonies in Ontario to beaver trappers. The Unit also utilizes aerial photographs in addition to flying aerial surveys for the area of interest to locate the beaver colonies. These locations are then identified on FRI maps.

OBSERVATIONS

The data provided to the Fur Management Unit is in the form of computer hard copy output. Due to the strict budget of the Unit, changes to the way in which the data is sorted and formatted is not possible. This may cause a delay in the completion of the project if the staff has to manually sift through the computer-generated output to obtain the information they require.

FUTURE NEEDS AND WANTS

At present, the Unit does not have the necessary facilities to carry out sophisticated analysis on all the data available through the computer. This involves the ability to carry out sophisticated statistical analysis, the automated plotting of charts and graphs on the available data and on-line query capabilities.

G.I.S. POTENTIAL

Access to G.I.S. capabilities would benefit this Unit. The ability to retrieve data on-line according to user defined keys or headings, perform statistical analysis and plot the information on a digital map would improve the Unit's monitoring function. An example would involve polygon analysis for overlaying of species habitat versus land type, species habit versus trapline or pelt quality versus season and land type. This data would then be automatically plotted on a small scale digital map. Other procedures which would be useful include: vector/cell conversion, polygon dissolve, point in polygon, windowing, aggregation, contiguity analysis, query, graphic superimposition, polygon and point mapping, and business graphics.

DATA SOURCE INFORMATION SHEET

TITLE: Reports by Fur Management Unit

SOURCE AGENCY: Fur Management Unit, Wildlife Services

PERSON: Milan Novak

TITLE: Commercial Wildlife Coordinator

ADDRESS: Room 2423
Whitney Block
Queen's Park

PHONE: (416) 965-3345

DESCRIPTION: Production of 15-20 reports annually on the harvest of fur bearing animals in Ontario. This data is also manually plotted on small scale maps of Ontario.

FORMAT:

	M	A	MEDIA
MAP	X		small scale
TABULAR		X	magnetic tape
IMAGE			
TEXT			
LIBRARY			

NOTE: maps: NTS, Angus Hill District, and other small scale maps

SCALE: 1:1,000,000
1:250,000

ACCURACY/RESOLUTION: high accuracy not required. The main purpose of maps for aggregation & display of harvest data

SIZE/VOLUME: 6 million items on the annual harvest are recorded.

GROWTH RATE: 6 million items/year

DATA ITEMS:
- trapper's assigned number, name, address, age, species quota, trapper status, land area, lot, concession & township
- type & number of pelts harvested and sold, royalty and dealer information

RETRIEVAL KEY(S): the data is sorted according to the type of report generated (see examples)

GEOCODE: obtained from the trapper's licence number which contains 10 characters: MNR district 2
Officer Patrol Area 2 *

DATE OF CREATION:

FREQUENCY OF UPDATE:
- harvest data on the computer is updated 10 times per year
- maps showing traplines - annually**

COVERAGE/COMPLETENESS: entire province, wherever trapping takes place.

SOURCE OF INFORMATION:
Sealing Report
Trapping Licence MNR
Ontario Fur Trappers Association provides Dealer Purchase Reports

USERS OF INFORMATION:
- MNR district offices to set quotas
- other sections within Wildlife Branch
- other agencies for e.g. soils research, environmental impact studies

VOLUME/FREQUENCY OF USE: continuous

ACCESS METHOD FOR USER: from computer generated reports

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: IBM 370
Queen's Park

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
- Problems: no on-line access to data
- overwhelmed by amount available
- lack facilities to carry out sophisticated analysis of data e.g. statistical analysis
- lack automated plotting facilities

*Trapper type 1
Trapline or township 3
Unique trapper 2

**This takes 2 weeks to incorporate approx. 50 changes.
- other maps showing aggregate are no longer updated due to manpower shortage

DATA SOURCE INFORMATION SHEET

TITLE: Aerial Beaver Surveys

SOURCE AGENCY: Fur Management Unit, Wildlife Services
PERSON: Milan Novak
TITLE: Commercial Wildlife Coordinator
ADDRESS:
Room 2423
Whitney Block
Queen's Park

PHONE: (416) 965-3345

DESCRIPTION: This involves the identification of beaver colonies from aerial photos and plotting this information on FRI maps.

FORMAT:

	M	A	MEDIA
MAP		X	[illegible] maps
TABULAR			
IMAGE	X		aerial photos
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: Identification of lake.

SIZE/VOLUME: Represents a very small portion of work carried out by this unit.

GROWTH RATE: N/A

DATA ITEMS: Aerial photo of area of interest. Beaver colonies are identified and plotted on FRI maps & topographic maps

RETRIEVAL KEY(S): N/A

GEOCODE: Lake name as designated on FRI map.

DATE OF CREATION: N/A

FREQUENCY OF UPDATE: N/A

COVERAGE/COMPLETENESS: N/A

SOURCE OF INFORMATION: Aerial photos.

USERS OF INFORMATION: Trappers

VOLUME/FREQUENCY OF USE: Whenever requested. This is not frequent.

ACCESS METHOD FOR USER: N/A

AVAILABILITY: Open

CHARGES: None

HARDWARE AND LOCATION: N/A

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Fur Management Unit

MINISTRY: Natural Resources

GROUP: Outdoor Recreation

BRANCH: Wildlife

SECTION: Wildlife Survey

UNIT: Fur Management

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

			TABULAR DATA								CARTOGRAPHIC DATA						
											GENERATION						STORAGE
AGENCY FUNCTIONS			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
	1	Fur Harvest		●	●	●	●	●	☐	●	○	☐		◐			◐
		Monitoring															
		(includes Beaver															
		Survey)															

			CARTOGRAPHIC DATA													
			MANIPULATION / ANALYSIS													
			GEOMETRIC ANALYSIS													
AGENCY FUNCTIONS			POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
	1	Fur Harvest	◐	◐	☐	◐			☐		☐			☐		☐
		Monitoring														
		(includes Beaver														
		Survey)														

			CARTOGRAPHIC DATA													
			MANIPULATION / ANALYSIS													
			NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
AGENCY FUNCTIONS			OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
	1	Fur Harvest													◐	◐
		Monitoring														
		(includes Beaver														
		Survey)														

			CARTOGRAPHIC DATA										IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
			DISPLAY																						
			COMPOSITION					PRESENTATION																	
AGENCY FUNCTIONS			QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
	1	Fur Harvest					◐	☐	◐											☐	☐				
		Monitoring																							
		(includes Beaver																							
		Survey)																							

10.5.3.1.2 INFORMATION DATA SYSTEMS UNIT

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of this Unit is to perform a public service by verifying purchases of lost hunting licences and examination certificates to enable hunters to purchase new hunting licences. Another responsibility of this Unit is to accumulate, store and analyse hunting data on deer, moose, bear, and small game within the province. The information resulting from this analysis is utilized by the Wildlife Branch to develop policies in regard to the management of wildlife resources.

The cost involved with this program is approximately $130,000 annually. This includes $20,000 in data processing charges on the Queen's Park computer and $40,000/annum for postage. The remainder, $70,000, is for the salaries for the staff of three.

TASKS/SYSTEMS

The land-related tasks of the Unit involve storing and verifying hunting licences and to compile, store and analyse various hunting-related data.

1. Store and Verify Hunting Licences

The Information Data Systems Unit acts as the repository for the hunting licences that are issued at the district level. At present, there are approximately 500,000 hunting licence records residing on magnetic tapes. These are names from licences used in mail surveys and special projects.

The records are used to verify the status of a hunter if he should lose his licence.

2. Compile, Store and Analyse Data

Four types of data are handled by this Unit: Big Game Hunting Harvest Data, Big Game Non-Hunting Mortality Data and Big Game Export Permits, all of which are stored in one file, and Big and Small Game Mailing Surveys, which are stored in a second file. Each of these is described below.

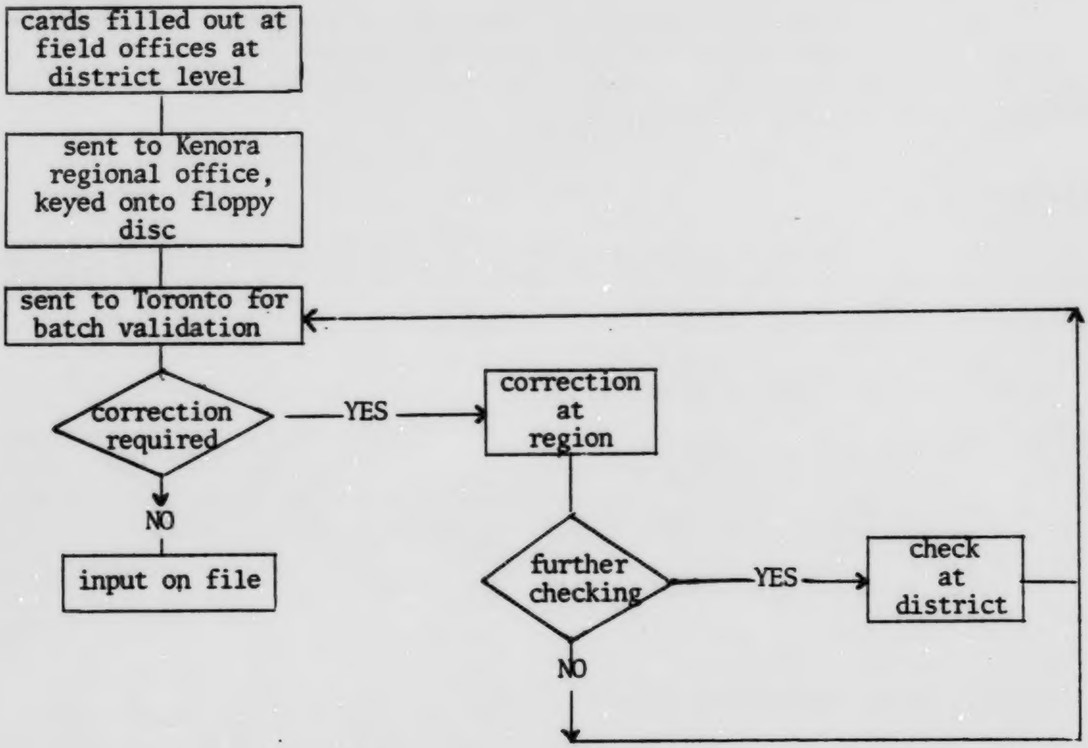
a. Big Game Harvest/Non-Hunting Mortality/Export Permit File

The big game harvest portion of this file is concerned with the location and number of big game (deer, moose and bear) killed by hunters within the province. The non-hunting mortality portion is concerned with the number, location and type of big game killed by non-hunting methods, such as cars, trains, etc. Information for both are provided on a voluntary basis.

The export permit is used to monitor the number and type of big game killed in the province by non-resident hunters.

The harvest information is collected at the district level on 10 km x 10 km grid cells related to the UTM grid and recorded on cards coded for computer entry. There are three separate cards: the big game harvest card, the big game non-hunting mortality card and the export permit card, which are contained in the Appendix.

Data on the cards is keyed onto floppy discs in Kenora, sent to Toronto for batch validation and returned to the regional office, if required, for correction. If more corrections are required, they are returned to the district level. The process is illustrated below:


cards filled out at field offices at district level
sent to Kenora regional office, keyed onto floppy disc
sent to Toronto for batch validation
correction required
YES
correction at region
NO
input on file
further checking
YES
check at district
NO

The big game harvest information is collected throughout the province at MNR offices and check stations in strategic field locations.

b. Big Game/Small Game Mailing Survey File

Harvest data is submitted by hunters at the checking stations on a voluntary basis. It is estimated that only 50% of the kills are reported. For this reason a mailing survey is utilized to supplement the data received at the field checking stations to estimate harvests. These surveys are sent to registered hunters, and request information on type of animal and location (direction and distance from nearest town) of the harvest. Information is keyed onto the computer files at Queen's Park.

OBSERVATIONS

Several problems arise in regard to the data received by this Unit. The major problems are as follows:

- Data validation is complex, error-prone and time-consuming since data in Northern Ontario is all keyed in Kenora, sent to Toronto for batch validation, returned to the region for correction and to the districts for further correction and finally back to Toronto.
- Data is not complete since reporting is voluntary.
- Not all coded data can be processed on the computer due to a shortage of staff and financing, hence a backlog of data entry exists. In addition, the necessary computer programming is incomplete.

Maps are not considered essential to the service provided by this Unit. Small scale maps are used occasionally to pinpoint the location of kills and FRI maps are used occasionally in some studies to determine forest coverage or the extent of forest fires for certain areas.

A large topographic data file based on UTM grid cells is being created for correlation of wildlife kill data with terrain, forest cover, burned area data and land use patterns. This file is now 90% complete for the Northwestern Region of MNR.

FUTURE NEEDS AND WANTS

In order to provide greater flexibility in regard to the collection and analysis of data, the district offices should have access to alphanumeric computer terminals for intelligent data entry. If these district facilities were linked together and to the central computer facility at Queen's Park, the data collection, verification and reporting processes would be enhanced and made more efficient.

Presently, the Section lacks sufficient personnel and facilities to carry out sophisticated analysis of the data available. The ability to generate statistical bar charts and graphs would complement the existing statistical analysis package. In addition to this, the ability to automatically plot data on maps would also be seen as an advantage.

G.I.S. POTENTIAL

Maps are utilized by this Unit, however, they are not considered an essential or major component of the services provided. Nonetheless, the availability of a digital map base and data base management capabilities as may be provided through a G.I.S. would improve the collection, maintenance and analysis functions carried out by this Unit.

The digital map itself would be utilized to display point information as well as the results from polygon analysis such as the land type versus some vital statistics of the animals killed in a certain area.

The greatest potential of the G.I.S. for this Unit would involve the collection, storage and manipulation of the large amounts of data received by the small staff. In this regard, a computer link to the district offices to speed up the collection and verification process and on-line access to the data stored on the Queen's Park computer to manipulate the data and carry out statistical analysis, would enhance the Unit's present capabilities.

Business graphics for both analysis and display purposes are another potential product of a G.I.S. which would serve the needs of this Unit.

DATA SOURCE INFORMATION SHEET

TITLE: Hunting Licences

SOURCE AGENCY: Wildlife Services
Information Data Systems

PERSON: J. M. Barbowski

TITLE: Information Data Systems Coordinator

ADDRESS: Room 2325
Whitney Block
Queen's Park

PHONE: (416) 965-4521

DESCRIPTION: Responsibility to maintain hunting licences for large game in the province.

FORMAT:

	M	A	MEDIA
MAP			
TABULAR			
IMAGE			
TEXT			
LIBRARY	x	x	

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: Approximately 500,000 records reside on tape.

GROWTH RATE: 10,000 to 50,000 per annum

DATA ITEMS: Identification of hunter, name and addresses from mail surveys

RETRIEVAL KEY(S): Hunter's name and birthdate

GEOCODE: N/A

DATE OF CREATION:

FREQUENCY OF UPDATE: Annual

COVERAGE/COMPLETENESS:

SOURCE OF INFORMATION:
Applicants for hunting licences.

USERS OF INFORMATION:
- Ministry to check hunters status if licence is lost
- occasionally the police and conservation officers

VOLUME/FREQUENCY OF USE: Continuous.

ACCESS METHOD FOR USER:
From computer output for those recorded on computer, otherwise manual.

AVAILABILITY: Open

CHARGES: None

HARDWARE AND LOCATION: IBM 370
Queen's Park

SOFTWARE: Fortran

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
Lack of staff to maintain computer files on hunting files.

DATA SOURCE INFORMATION SHEET

TITLE: Big Game Harvest/Non-Hunting Mortality/Export Permit File

SOURCE AGENCY: Wildlife Services
Information Data Systems

PERSON: J. M. Barbowski

TITLE: Information Data Systems Coordinator

ADDRESS: Room 2325
Whitney Block
Queen's Park

PHONE: (416) 965-4521

DESCRIPTION: Accumulation, storage & analysis of large & small game hunting & non-hunting kill data via questionnaires submitted by hunters.

FORMAT:

	M	A	MEDIA
MAP	x		map of Ontario
TABULAR		x	computer
IMAGE			
TEXT			
LIBRARY			

NOTE: FRI maps are used to determine forest cover & size of burn areas infrequently

SCALE: 1:500,000 maps of Ontario to plot kill locations and define management units

ACCURACY/RESOLUTION: Accuracy to within 10 km, i.e. use of 10 km grid cell.

SIZE/VOLUME: Approximately 89,000 records on sequential formatted files.

GROWTH RATE: 16,000 - 20,000 records per year

DATA ITEMS: Big Game Harvest Data/ Export Permit/Non-Hunting Mortality

- date & location of kill
  - wildlife management unit
  - MNR district
  - 10 km UTM grid cell
  - township
- animal species & vital statistics
- hunter identification, name, address & hunting licence

RETRIEVAL KEY(S): The data is sorted according to the major data items in the computer outputs generated.

GEOCODE:
- 10 km x 10 km UTM grid which may be cross-referenced to provincial grid cell I.D.
- MNR district
- wildlife management unit
- township

DATE OF CREATION:

FREQUENCY OF UPDATE: Harvest Data & Export Permit - as determined by hunting season
Non-Hunting Mortality - continuous

COVERAGE/COMPLETENESS: Only 50-60% of kill data reported since it is voluntary. This program involves the entire Province.

SOURCE OF INFORMATION:

i) Big Game Harvest Card
ii) Big Game Non-Hunting Mortality Card
iii) Export Permit Card

USERS OF INFORMATION:

- Wildlife Research Section - Maple
- MNR districts & regions (conservation officers and biologists)

VOLUME/FREQUENCY OF USE: Continuous

ACCESS METHOD FOR USER:

Annual reports or as required hardcopy printed reports.

AVAILABILITY: On request but requires batch processing and programming if not a standard request.

CHARGES:

HARDWARE AND LOCATION: IBM 370 Queen's Park.

SOFTWARE:
- Fortran programs developed by Barbowski
- SAS

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
- data validation is error prone, time consuming and complex
- data is not complete since it is provided on a voluntary basis

Intending to improve data capture process by the Ministry's new mini-computer network.

***A large topographic data file based on UTM grid cells is being created for correlation of wildlife data with terrain, forest cover and burned area data. This file is 90% complete for the NW region.

DATA SOURCE INFORMATION SHEET

TITLE: Big Game/Small Game Mail Survey

SOURCE AGENCY: Wildlife Services
Information Data Systems

PERSON: J.M. Barbowski

TITLE: Information Data Systems Coordinator

ADDRESS: Room 2325
Whitney Block
Queen's Park

PHONE: (416) 965-4521

DESCRIPTION: To accumulate data through mail survey to increase information on hunting & non-hunting kills of large & small game.

FORMAT:

	M	A	MEDIA
MAP	x		Ontario map
TABULAR		x	computer
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1:500,000 of Ontario to plot kill locations and define management units

ACCURACY/RESOLUTION: 10 km grid

SIZE/VOLUME: 400,000 records on magnetic tape

GROWTH RATE: 20,000 to 30,000 records per annum

DATA ITEMS:

Big Game/Small Game Mail Survey

- vital statistics of animals killed
- location (see geocode)
- method of hunting

RETRIEVAL KEY(S): Cross-referenced

GEOCODE:
- hunting zone
- MNR administration district
- relation to nearest town

*) i.e. direction & distance

DATE OF CREATION:

FREQUENCY OF UPDATE: Mail Survey - annual

COVERAGE/COMPLETENESS: Province-wide returns.

SOURCE OF INFORMATION: Hunters who have been registered via a licence purchase

USERS OF INFORMATION:

- Wildlife Research Section in Maple
- MNR districts - conservation officers and biologists
- Wildlife Services Branch

VOLUME/FREQUENCY OF USE:

Continuous

ACCESS METHOD FOR USER: From computer output.

AVAILABILITY: Open

CHARGES: None

HARDWARE AND LOCATION: IBM 370
Queen's Park

SOFTWARE: Fortran
SAS

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

*) - township

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Information
Data Systems

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
◉ AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
AGENCY FUNCTIONS		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Big Game Hunting Mortality															
	Big Game Non-Hunting Mortality		●	●	●	●	●	☐	●							
	Export Licence															
2	Mail Surveys	○	●	●	●	●	●	☐	●							
3	Hunting Licences		◉	◉	◉	◉	◉	☐	◉							

		CARTOGRAPHIC DATA																											
		MANIPULATION / ANALYSIS																											
		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
AGENCY FUNCTIONS		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Big Game Hunting Mortality																												
	Big Game Non-Hunting Mortality	☐																										☐	☐
	Export Licence																												
2	Mail Surveys	☐																										☐	☐
3	Hunting Licences																											☐	☐

		CARTOGRAPHIC DATA										IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		DISPLAY																						
		COMPOSITION					PRESENTATION																	
AGENCY FUNCTIONS		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Big Game Hunting Mortality																							
	Big Game Non-Hunting Mortality							☐											☐	☐				
	Export Licence																							
2	Mail Surveys							☐											☐	☐				
3	Hunting Licences							☐											☐	☐				

10.5.3.2 WILDLIFE RESEARCH SECTION

10.5.3.2.1 BIG GAME, PREDATOR AND RABIES UNITS RADIO TELEMETRY SYSTEM

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of these Units is to research, study and document the ecology of provincially important wildlife populations from radio telemetry data. Radio telemetry information provides baseline data in order to facilitate wildlife management. A staff of 5 full-time and 8-12 contractors complete the tasks to fulfill this responsibility.

TASKS/SYSTEMS

1. Maintain Radio Telemetry Inventory

The following steps are performed:

a) The Units collect field data directly and record information on standardized forms including: species, Ministry identification number, age, month, day, year, and hour of sighting, family, sex, age, and location (within a 100-metre grid cell) of an animal (see the Appendix for examples of standardized forms).

b) The Units enter the data into the automated data base.

c) The data are manipulated to produce a variety of correlation studies (e.g., correlation of animal activity with habitat) and statistical, spatial, time series and cluster analyses to determine movements, activity and population dynamics for understanding wildlife (see the Appendix for examples).

As a geographical reference the 1:50 000 NTS map series is used.

The software used for the wildlife telemetry data was developed at Queen's University and runs on a PDP11. This is the same system that is used for the Rabies Incidence Records. The software used includes a file management system called Q'TEXT, an interactive mapping package called Q'MAP, a package which builds cross-tabulations and retrieval files called Q'UERY, a home range analysis package entitled HOME and a locational data analysis package called LIP.

The users of this information are district offices, wildlife management planners and members of the general public. The information is available at no cost.

OBSERVATIONS

If the land-related data utilized by this Unit were available in a standardized format, the Unit could more effectively fulfill its responsibilities. A great deal of potential exists for more detailed analyses if such data could be standardized.

FUTURE NEEDS AND WANTS

The Units use the 1:50 000 NTS map series for geographical reference. However, one of the main needs for these Units is that all data should be referenced using the standard UTM grid. For example, there is a need for good quality habitat maps in order to more effectively correlate habitat to animal activity. In light of this, the habitat maps would have to include information on land use, crop and soil type, forestry, physiographic and topographic data, etc. on a UTM base.

The Units do not use the FRI or soil maps because they are not standardized to the UTM grid and are very difficult to standardize to the UTM grid. There has been some discussion with the Ontario Centre for Remote Sensing (OCRS) to provide some of these maps; however, the costs and availability are not yet appropriate to carry out these Units' responsiblities. Currently, some plotting is being done using automated mapping and digitized township boundaries.

G.I.S. POTENTIAL

There is a strong need for a comprehensive geographical information system in Ontario as these Units have a requirement for data from a variety of sources in standardized formats with regard to geographical reference. If the data were available in a standard georeferenced format, the Units could eliminate very time-consuming and inaccurate manual transformations between geographic data formats.

The Units would use polygon overlay capabilities for overlaying a variety of themes such as soil, vegetation, etc. to determine the location of wildlife habitats. Buffering would be of value to these Units for gathering information on buffer areas around lakes, rivers, and so forth. The Units would also use a windowing capability to focus on township, lake areas or any other user-defined window area. Area/perimeter and line length calculations could also be used to examine such things as habitat areas and distances that wildlife move within habital areas.

DATA SOURCE INFORMATION SHEET

TITLE: Wildlife Telemetry

SOURCE AGENCY: Big Game and Rabies Unit
PERSON: Dennis Voigt
TITLE: Research Scientist
ADDRESS: P.O. Box 50
Maple, Ontario
LOJ 1EO

PHONE: (416) 832-2761

DESCRIPTION: inventory of radio telemetry data

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	floppy disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 35,000 - 40,000 records

GROWTH RATE: 4,000 - 5,000 records annually

DATA ITEMS: species, identification number, month, day, year, hour, status, location, sex, family

RETRIEVAL KEY(S): species, identification number, month, day, year, hour, status, location, sex, family

GEOCODE: township

DATE OF CREATION: 1973

FREQUENCY OF UPDATE: 500-700 records weekly

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: field reports

USERS OF INFORMATION: internal to MNR and public

VOLUME/FREQUENCY OF USE: constant inquiries from public and MNR personnel

ACCESS METHOD FOR USER: reports on demand that are user specified, published reports in scientific journals

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: PDP11, VT100, Tektronic terminal, accoustic coupler
Maple, Ontario

SOFTWARE: Q'TEXT - file management system
Q'UERY - analysis package
Q'MAP - mapping

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Radio (Wildlife) Telemetry

LEGEND:
○ MANUAL PROCESS
◉ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	CODO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Maintain Inventory	○	●	●	●	●	●	●	●							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Maintain Inventory	◉					◉	◉			◉	◉			

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Maintain Inventory														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Maintain Inventory						☐	☐	☐		

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Maintain Inventory													

10.5.3.2.1.1 SNOW STATION SYSTEM

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of this System is to monitor levels of snow at various stations throughout the province. The Snow Station System was set up in 1952 to facilitate the management of wildlife, and particularly, management of deer and moose where the depth of snow affected the movement patterns and survival of those animals. Wildlife managers using this data were encouraged to take appropriate management steps when snowfall levels become high.

TASKS/SYSTEMS

1. Maintain Snow Station Inventory

The following steps are performed:

a. The Unit receives information from an average of 90 snow stations on formatted sheets (see the **Appendix**). The district code, station, week number and the average depth of snow calculated from 10 sites on the Monday of every week, as well as a code which refers to the snowcrust characteristics. Associated with this information is more detailed data concerning the snow stations with respect to the years of operation, geographic reference, latitude/longitude, elevation and the forest type and species.

b) Although this information was stored manually in the past, it has recently been completely automated. Thus, when the Unit receives reports from the station, they are entered into the automated data base.

c) Once this information has been entered, time series analyses are conducted and this information is correlated with deer and moose populations for wildlife management.

d. The data is also presented in the form of a time series plot to provide a visual aid to planners.

The software currently being used was developed at Queen's University and purchased from them. It includes Q'TEXT, a file management system, Q'UERY, a package to build cross-tabulations, Q-CART, an interactive plotting package and also Fortran programs for plotting and metrifying data.

The users of this information include Ontario Hydro and various sections within the Ministry of Natural Resources for agricultural planning, flood control and other applications.

OBSERVATIONS

The Unit's current needs are being met by the newly installed automated system currently employed. The Unit has purchased a Professional 350 for data processing. Currently, the Q'TEXT package is available on the Professional 350. The Fortran programs and Q'UERY package will be available on the Professional 350 in the future.

FUTURE NEEDS AND WANTS

District offices could enter data on a local computer and relay data via communication lines directly to the Maple system.

G.I.S. POTENTIAL

The information maintained by this Unit could be of interest to other agencies which are currently unaware of this data source. If this data were available in a G.I.S. system, users would access the information for such purposes as planning for utility provision, flood control, agricultural planning, and so forth.

Since the analysis required by this Unit is currently being done on a computer system, the potential of a G.I.S. system is limited.

DATA SOURCE INFORMATION SHEET

TITLE: Snow Station Network

SOURCE AGENCY: Wildlife Research

PERSON: Dennis Voigt

TITLE: Research Scientist

ADDRESS: P.O. Box 50
Maple, Ontario
LOJ 1EO

PHONE: (416) 832-2761

DESCRIPTION: inventory and analysis of snow depths

FORMAT:

	M	A	MEDIA
MAP		x	time series plots
TABULAR		x	floppy disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: 90 stations since 1952
80,000 records total

GROWTH RATE: 2,500 records annually

DATA ITEMS: year, region code, district code, station, week number, average snow depth, crust and snow characteristics

Station Information - years of operation, geographic reference, latitude/longitude, elevation and forest type and species

RETRIEVAL KEY(S): any of the Data Items

GEOCODE: region code, district code, latitude and longitude

DATE OF CREATION: 1952

FREQUENCY OF UPDATE: 500 records montly for 5 months per year

COVERAGE/COMPLETENESS: 90 stations across Ontario

SOURCE OF INFORMATION: Snow Station information form

USERS OF INFORMATION: internal to MNR and Ontario Hydro

VOLUME/FREQUENCY OF USE: as required by planners

ACCESS METHOD FOR USER: phone to request information or reports

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: PDP11, VT100, Tektronix terminal, acoustic coupler, in Maple, Ontario

SOFTWARE: Q'TEXT - file management system
Q'UERY - to build correlations
Q'CART - to plot

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Snow Station

LEGEND:
- ○ MANUAL PROCESS
- ● NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS

		TABULAR DATA								CARTOGRAPHIC DATA: GENERATION						CARTOGRAPHIC DATA: STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Maintain Snow Station Inventory	○	●	●	●											
2	Develop Wildlife Management Policy					●	●	●								

		CARTOGRAPHIC DATA: MANIPULATION / ANALYSIS: GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Maintain Snow Station Inventory														
2	Develop Wildlife Management Policy														

		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Maintain Snow Station Inventory														
2	Develop Wildlife Management Policy														

		DISPLAY: COMPOSITION					DISPLAY: PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Maintain Snow Station Inventory										
2	Develop Wildlife Management Policy										

		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES	
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	TIME SERIES PLOTS	CORRELATION
1	Maintain Snow Station Inventory													●	
2	Develop Wildlife Management Policy													●	●

10.5.3.2.1.2 RABIES CASE RECORDS AND ORRAVAX NECROPSY RECORDS

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of this Unit is to develop a program for monitoring and controlling rabies incidence in Southern Ontario. A staff of three full-time and four contract people run this program which comprises two systems:

1) Rabies Information System (RIS)
2) Oral Rabies Vaccine (ORRAVAX)

TASKS/SYSTEMS

1. Develop and Maintain Control Systems for Rabies

Rabies ecology involves studying rabies outbreaks and their spatial distribution over time to determine rabies problem areas, and to identify places for rabies control via oral rabies vaccine. The steps involved in this program are as follows:

a) Exposure to a rabies suspect animal (human, pet or livestock) is reported to the Ministry of Natural Resources, to the Ministry of Health or to the Health of Animals Division of Agriculture Canada.

b) The MNR or MOH, if notified first, then notify the Health of Animals Division (H of A). The H of A arranges for the pick-up and rabies diagnosis of the specimen.

c) After diagnosis, the H of A completes a standardized form including data on:

   - listing of diagnosed case by species
   - a sequential identification number assigned by Agriculture Canada
   - location of the sighting by lot, concession, township and county.

   The name and address of the person who sighted the animal and the name of the doctor who diagnosed the rabies are not included in the data base, as this is highly confidential information.

d) The form is sent to the Research Scientist at the Maple office by tape, where it is loaded onto the data base.

e) At regular intervals, reports are generated to determine rabies ecology. This involves:

   - determining the number and frequency of rabies cases in a given area, and;
   - plotting graphically rabies incidence distribution on a

digitally stored base map.

The base map contains the outlines of the townships which were digitized from a 1:250 000 NTS map. The information on the map is stored in UTM co-ordinates. The rabies information is not stored by UTM in its data base. However, a township code is stored and this permits the plotting of the information by code. For six counties, a UTM geocoded centroid is available. This permits a more locationally accurate display of rabies incidence by the county UTM centroid.

The report information is used for predictions of rabies outbreak in the Oral Rabies Vaccine Program.

2. Maintain ORRAVAX Program Inventory

The ORRAVAX program is not fully implemented at this time. However, for future ORRAVAX operations the following steps will be taken:

a) Analysis of reports and graphic products produced under the Rabies Ecology program is carried out to determine the most effective site where oral rabies vaccine could be placed.

b) The field office in the future will place bait containing the vaccine as instructed by head office.

c) The Unit also obtains necessary information from autopsies performed on animal specimens collected by trappers, hunters and the public. Pertinent information about the animal is put on stardardized forms for subsequent loading into the automated data base (see the Appendix).

d) Reports are generated which include information regarding whether the animal ate the bait, the number of baits present in the animal, the distance the animal travelled from the bait etc., as well as information on population dynamics of those species. The reports are used to monitor the effectiveness of the ORRAVAX program by listing a set of conclusions including an evaluation of areas requiring more or less rabies vaccine baits.

Users of the RIS and ORRAVAX data include the Ministry of Health and Agriculture Canada, which are kept up-to-date on rabies outbreaks in Southern Ontario, internal use in the Ministry of Natural Resources for wildlife management and queries from the general public, which is concerned about rabies incidence in Southern Ontario. Another major user of this data is the media. Several calls a week are received by this Unit from the news media with respect to rabies outbreak areas and control methods.

The software currently being used for file management and analysis was developed by Queen's University and purchased from them. The software includes a file management system called Q'TEXT, Q'UERY which builds cross-tabulations and retrieval files, and an interactive plotting package called Q'MAP.

OBSERVATIONS

The Rabies Unit's needs are being met by the automated system currently employed. The software developed at Queen's University and the hardware that the Unit has purchased fulfill all current requirements of this Unit in carrying out its mandate.

FUTURE NEEDS AND WANTS

Currently, a study is being conducted in conjunction with Queen's University, Agriculture Canada and the Rabies Advisory Committee to examine the use of storing and loading RIS data by grid cell. This would avoid such problems as inaccurate township locations from postal code data. For example, if a sighting was listed to the nearest postal code and the town is on or near the border of two townships, it is difficult to judge in which township the sighting was made.

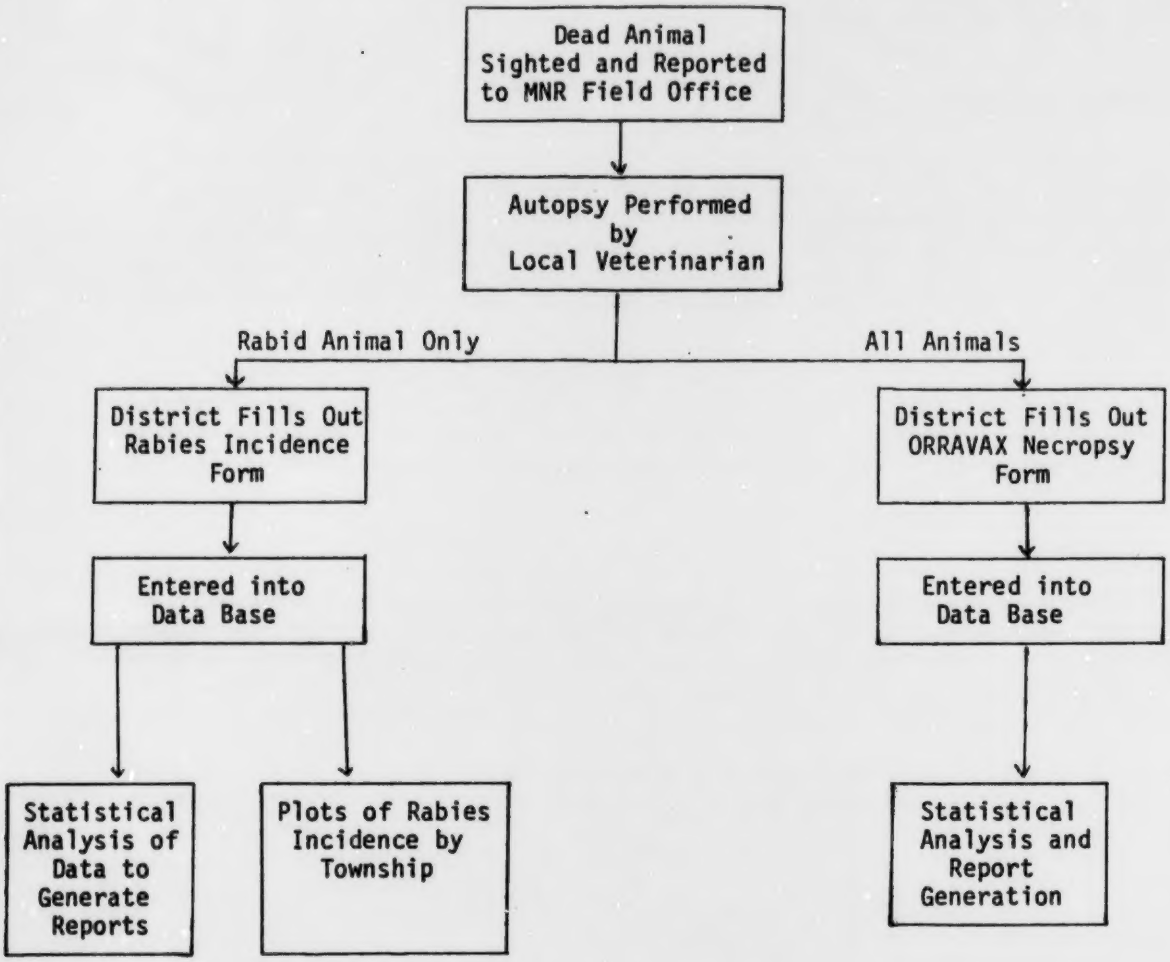
The need for up-to-date data was also specified by this Unit. Currently, data is received monthly and queries from the public are received within days of a sighting. Access to the information on a daily or even a weekly basis would help this Unit in answering media and public queries.

G.I.S. POTENTIAL

The Unit maintains spatially related data that could be of interest to other agencies who are currently unaware of this data source. The information could be used to correlate rabies incidence with other environmental factors and land use, in order to enhance the knowledge base and to refine such activities as recreational planning and agricultural procedures.

A digital topographic mapping capability would be most useful to this Unit for handling and recording spatially related data.

WORKFLOW
RABIES UNIT


Dead Animal Sighted and Reported to MNR Field Office
Autopsy Performed by Local Veterinarian
Rabid Animal Only
All Animals
District Fills Out Rabies Incidence Form
District Fills Out ORRAVAX Necropsy Form
Entered into Data Base
Entered into Data Base
Statistical Analysis of Data to Generate Reports
Plots of Rabies Incidence by Township
Statistical Analysis and Report Generation

DATA SOURCE INFORMATION SHEET

TITLE: ORRAVAX Necropsy Records

SOURCE AGENCY: Rabies Unit
PERSON: Dennis Voigt
TITLE: Research Scientist
ADDRESS: P.O. Box 50
Maple, Ontario
L0J 1E0
PHONE: (416)832-2761

DESCRIPTION: inventory of ORRAVAX Necropsy records

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	floppy disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: by township lot & concession, township

SIZE/VOLUME: 12,000 specimens

GROWTH RATE: 2,000 specimens annually

DATA ITEMS: ORRAVAX number, characteristics of the dead animal, location and date

RETRIEVAL KEY(S): ORRAVAX number, characteristics of the dead animal, location, date

GEOCODE: township lot & concession, township and county

DATE OF CREATION: 1971

FREQUENCY OF UPDATE: 20 specimens weekly

COVERAGE/COMPLETENESS: all of Southern Ontario

SOURCE OF INFORMATION: field reports

USERS OF INFORMATION: Ministry of Health, Wildlife Branch of the Ministry of Natural Resources, Canada Agriculture and the general public

VOLUME/FREQUENCY OF USE: as per report generation and distribution as required

ACCESS METHOD FOR USER: reviewing of published reports and maps supplied on request

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: PDT 11, VT100, Accoustic Coupler, Tektronix terminal
Maple, Ontario

SOFTWARE: Q'TEXT-file mgt system, Q'UERY-to build cross tabulations, Q'MAP-interactive plotting pkg. Fortran program*

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

*in-house customized statistical manipulations i.e. correlations

DATA SOURCE INFORMATION SHEET

TITLE: RABIES CASE RECORDS

SOURCE AGENCY: Rabies Unit
PERSON: Dennis Voigt
TITLE: Research Scientist
ADDRESS: P.O. Box 50
Maple, Ontario
LOJ 1E0

PHONE: (416)832-2761

DESCRIPTION: a listing of diagnosed rabies cases

FORMAT:

	M	A	MEDIA
MAP		X	floppy disc, paper
TABULAR		X	floppy disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: by township lot & concession, township

SIZE/VOLUME: 30,000 records

GROWTH RATE: 1,500 records annually

DATA ITEMS: animal species, sequential identification number assigned by Agriculture Canada, location by township lot & concession, township and county

RETRIEVAL KEY(S): animal species, sequential identification number assigned by Agriculture Canada, location by township lot & concession, township and county

GEOCODE: township lot & concession, township and county

DATE OF CREATION: 1958

FREQUENCY OF UPDATE: 28 records weekly

COVERAGE/COMPLETENESS: all of Ontario

SOURCE OF INFORMATION: field offices

USERS OF INFORMATION: Ministry of Health, Wildlife Branch of the Ministry of Natural Resources, Canada Agriculture and the general public

VOLUME/FREQUENCY OF USE: as per report generation and distribution as required

ACCESS METHOD FOR USER: review of published reports and maps available on request

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: PDT 11, VT100, Acoustic Coupler, Tektronix terminal
Maple, Ontario

SOFTWARE: Q'TEXT-file mgt. system,Q'UERY-builds cross tabulations,Q'MAP-interacti plotting pkg.,HOME-home range analysis pkg.,LIP-locational analysis pkg

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: RABIES CASE RECORDS AND ORRAVAX RECORDS

LEGEND:
- ○ MANUAL PROCESS
- ◉ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS

		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	Develop & Maintain Control System for Rabies	○	●	●	●	●	●	●	●
2	ORRAVAX Inventory	○	●	●	●	●	●	●	●

		CARTOGRAPHIC DATA						
		GENERATION						STORAGE
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Develop & Maintain Control System for Rabies							
2	ORRAVAX Inventory							

		CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS – GEOMETRIC ANALYSIS													
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Develop & Maintain Control System for Rabies				●			●							
2	ORRAVAX Inventory							●							

		CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Develop & Maintain Control System for Rabies													●	●
2	ORRAVAX Inventory													●	●

		CARTOGRAPHIC DATA – DISPLAY									
		COMPOSITION					PRESENTATION				
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Develop & Maintain Control System for Rabies	●				●	●	●			
2	ORRAVAX Inventory	●				●		●	●		

		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	LEGAL DESCRIPTION CO-ORDINATION
1	Develop & Maintain Control System for Rabies								●	●				●
2	ORRAVAX Inventory													●

10.5.3.2.2 UPLAND GAME AND WATERFOWL UNIT

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Upland Game and Waterfowl Unit is to compile and analyse data on migratory waterfowl to determine their migratory habits. Data to be analysed by the Unit's one-staff person is obtained from the legbands of captured or killed waterfowl of through sightings of colour marked waterfowl.

The information obtained from this research program usually results in the publication of scientific papers and articles for learned journals.

TASKS/SYSTEMS

1. Record and Analyse Waterfowl Locations and Information

The primary land-related task of this research program is to identify the location where waterfowl are captured, killed or sighted. Since high positional accuracy is not a requirement for this research, the grid cells of small scale maps of north America are sufficient for the identification of these locations. In this regard, the grid cells are identified representing where waterfowl are captured, and the number of waterfowl captured is placed within the appropriate grid cells. Figure 10.5.3.2.2-A illustrates this recording technique.

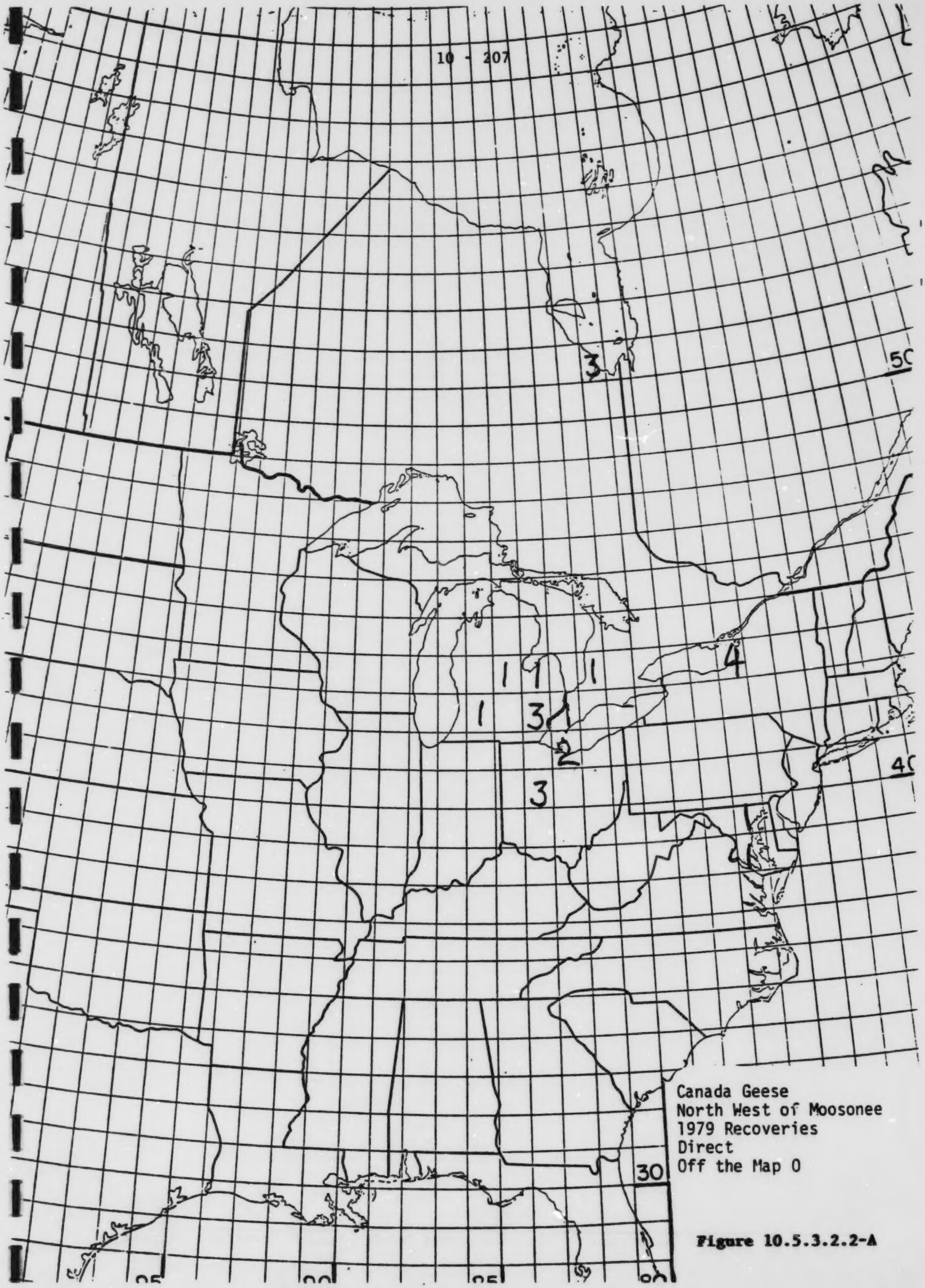
Basically, two types of maps are used for identifying the location of captured waterfowl. The choice of map depends on the accuracy required. For the purpose of high location accuracy, UTM maps showing 10 km. and 100 km. grids are utilized. An example is contained in the Appendix. In order to display the migratory habits of birds across large areas, very small scale maps are used. The 1^o cells on these maps are used to identify the location of the waterfowl banded in Ontario and recovered at other locations in North America. In certain cases, the 1^o cells of these maps are further subdivided into 10-minute cells if a higher locational accuracy is desired. Copies of the maps used are in the Appendix.

It should also be noted that some field work is required by this Unit. In this regard, aerial photographs are sometimes used to help identify the location where the waterfowl are reproducing.

This Unit analyses the migratory habits of approximately 5,000 captured waterfowl in any given year.

OBSERVATIONS

Due to the nature of the work carried out by this Unit, there does not appear to be any substantial transfer of information between this and other sections of the Wildlife Branch.


3
50
4
1
1
1
1
1
3
1
2
3
40
30
95
90
85
80

Canada Geese
North West of Moosonee
1979 Recoveries
Direct
Off the Map 0

Figure 10.5.3.2.2-A

FUTURE NEEDS AND WANTS

The present approach utilized for capturing the required data for analysis and the method used for its subsequent display are felt to be adequate. No future improvements or changes in the methods employed are felt to be necessary.

G.I.S. POTENTIAL

Although the Unit may benefit from the use of digital topographic maps at a small scale to display the location of recovered waterfowl, it may not be able to justify the cost of such an approach on its own.

DATA SOURCE INFORMATION SHEET

TITLE: Waterfowl Banding

SOURCE AGENCY: Upland Game Unit

PERSON: H. G. Lumsden

TITLE: Scientist

ADDRESS: Wildlife Research
Building
Maple, Ontario

PHONE: 832-2761

DESCRIPTION: Unit compiles data on migratory waterfowl; captures and bands waterfowl; recaptures banded waterfowl and analyzes band information to determine migratory habits.

FORMAT:

	M	A	MEDIA
MAP	X		hard copy
TABULAR			
IMAGE			
TEXT	X		journals
LIBRARY			

NOTE:

SCALE: Very small scale maps of North America.

ACCURACY/RESOLUTION: To the nearest 10' or 1° grid cell depending on application.

SIZE/VOLUME: Analyzes approximately 5000 banded birds per year.

GROWTH RATE: N/A

DATA ITEMS:
- birds by species
- location of banding and capture by 10'x10' or 1°x1° lat./long. grid cells

RETRIEVAL KEY(S): Bird species

GEOCODE: 10'x10' or 1°x1° lat./long. geographic grid cells depending on map scale and application requirement

DATE OF CREATION: Do not know

FREQUENCY OF UPDATE: N/A

COVERAGE/COMPLETENESS:

SOURCE OF INFORMATION: Field examination of bands from birds captured or killed.

USERS OF INFORMATION: Wildlife Research Section of MNR

VOLUME/FREQUENCY OF USE: As information is recorded from the bands, i.e. ±5000 per year.

ACCESS METHOD FOR USER: Open

AVAILABILITY: Through published papers and journals.

CHARGES: Nil

HARDWARE AND LOCATION: N/A

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

Special project underway:
- The unit-member is participating in the production of Breeding Bird Atlas which will describe distributions and show on accompanying maps information concerning nesting locations.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: WATERFOWL BANDING

MNR
Outdoor Recreation Group
Wildlife Branch
Wildlife Research Section
Upland Game Unit

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA							
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1 Record & Analyze Waterfowl Locations and Information	○	○	○	○	○	○	○	○

AGENCY FUNCTIONS	CARTOGRAPHIC DATA						
	GENERATION						STORAGE
	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Record & Analyze Waterfowl Locations and Information							

AGENCY FUNCTIONS	CARTOGRAPHIC DATA													
	MANIPULATION / ANALYSIS													
	GEOMETRIC ANALYSIS													
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Record & Analyze Waterfowl Locations and Information									○					○

AGENCY FUNCTIONS	CARTOGRAPHIC DATA													
	MANIPULATION / ANALYSIS													
	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Record & Analyze Waterfowl Locations and Information														

AGENCY FUNCTIONS	CARTOGRAPHIC DATA									
	DISPLAY									
	COMPOSITION					PRESENTATION				
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Record & Analyze Waterfowl Locations and Information						○	○			

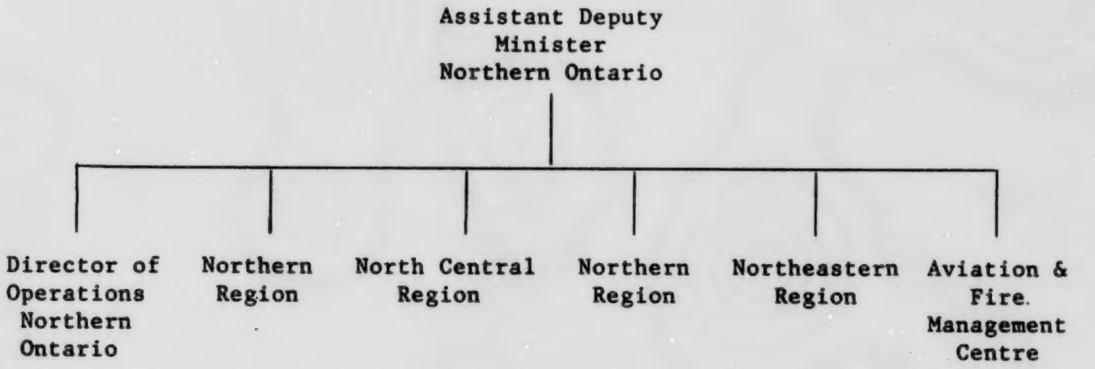
AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Record & Analyze Waterfowl Locations and Information				○	○	○							

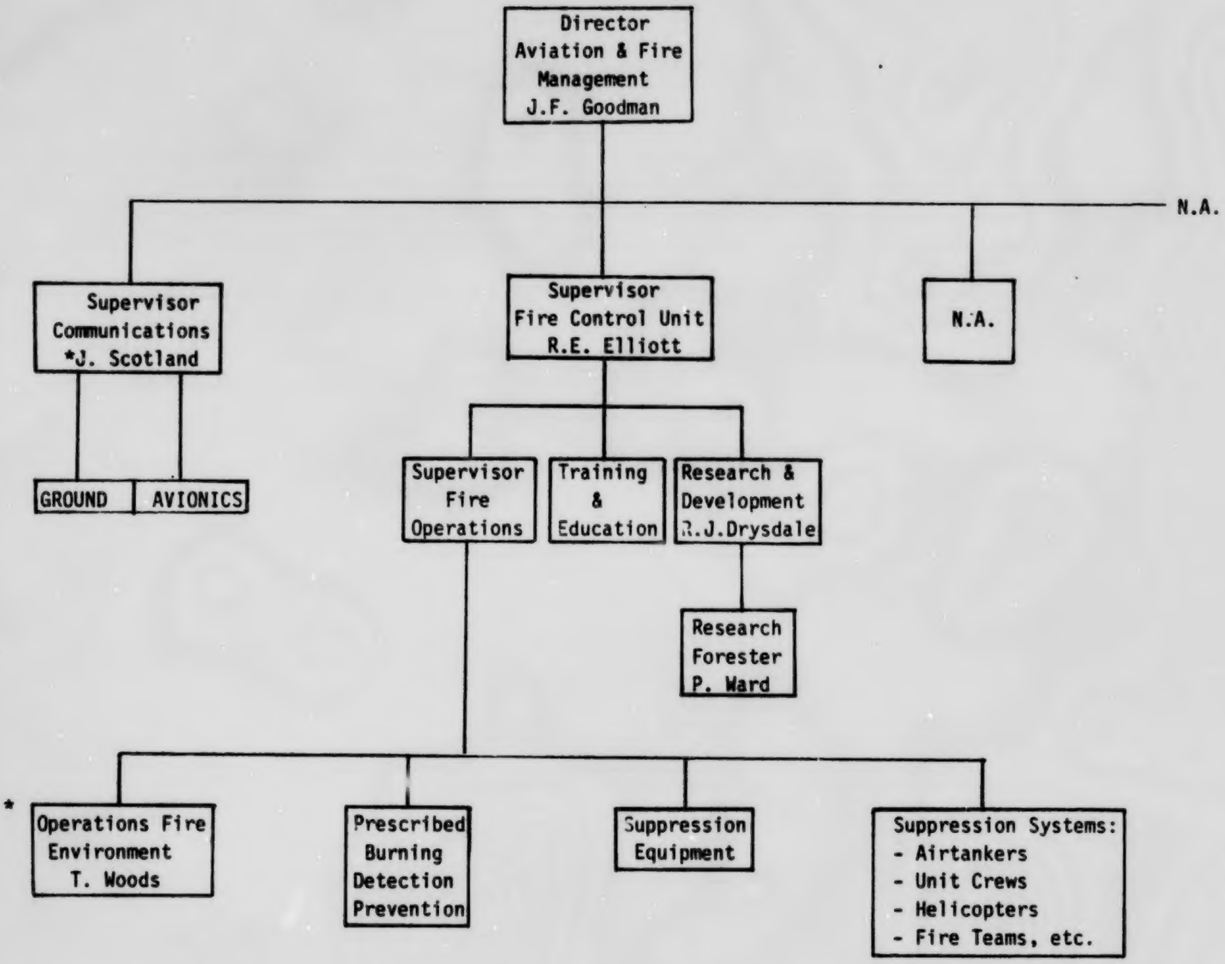
10.6 ASSISTANT DEPUTY MINISTER OF NORTHERN ONTARIO

The Assistant Deputy Minister of Northern Ontario is responsible for providing opportunities for resource development and outdoor recreation, for the benefit of the people of Northern Ontario. The Office is also responsible for the administration, protection and conservation of public lands and waters.

The Aviation and Fire Management Centre (AFMC) is administered by the Assistant Deputy Minister of Northern Ontario. The primary responsibility of this Centre is to protect Northern Ontario forests from damages due to fire. In this regard, the Centre not only fights forest fires but also takes steps to prevent forest fires from occurring.

The organization chart which follows illustrates the organizational structure under the Assistant Deputy Minister of Northern Ontario.


Assistant Deputy Minister Northern Ontario
Director of Operations Northern Ontario
Northern Region
North Central Region
Northern Region
Northeastern Region
Aviation & Fire Management Centre


Director
Aviation & Fire
Management
J.F. Goodman
N.A.
Supervisor
Communications
*J. Scotland
Supervisor
Fire Control Unit
R.E. Elliott
N.A.
GROUND
AVIONICS
Supervisor
Fire
Operations
Training
&
Education
Research &
Development
R.J.Drysdale
Research
Forester
P. Ward
*
Operations Fire
Environment
T. Woods
Prescribed
Burning
Detection
Prevention
Suppression
Equipment
Suppression Systems:
- Airtankers
- Unit Crews
- Helicopters
- Fire Teams, etc.

10.6.1 AVIATION AND FIRE MANAGEMENT CENTRE

10.6.1.1 FIRE CONTROL UNIT
PROVINCIAL FOREST FIRE RESEARCH AND DEVELOPMENT
FIRE ENVIRONMENT PROGRAM

ORGANIZATION AND RESPONSIBILITIES

To conduct research and develop systems and capabilities for forest fire detection, suppression and use. Five programs are associated with the Fire Environment Program, i.e.:

1) Fire Behaviour Analysis and Prediction System
2) Values and Values at Risk and Fire Impact
3) Fire Weather System
4) Fuel Management
5) Fire Information System

TASKS/SYSTEMS

1. Develop Systems for Fire Detection, Suppression and Use

a. Fire Behaviour Analysis and Prediction Sustem

This system is a methodology for predicting fire occurrences based on probability and statistical analysis. The system permits prediction on how many fires might be expected in a given area during a given period of time, i.e., on a daily, weekly, tri-weekly, monthly or fire season basis. The system currently depends on having experienced people knowledgeable about the history of fire occurrences in a given area. The knowledge has includes the cause, size and location of previous fires as well as rainfall, the time of year, fuel conditions, and the duration of the fire. For analysis purposes, fires are divided into two classes: Man Caused Fires and Lightning Fires.

In the area of **Man Caused Fires**, analysis is based on probability and the assumption that the historic record of fire occurrences in a given area over a long enough period of time will provide an indication of what can be expected in the coming fire season. The results are used for seasonal planning.

For **Lightning Fires**, at present, probability figures on potential fire occurrences from lightning are determined manually by fire services officers. Rainfall, fuel condition and other data shown on lightning location maps are used for these determinations.

Work is under way through R. J. Drysdale (Aviation and Fire Management Centre) and P. Kourtz (Petawawa National Forestry Institute) to develop elaborate fire prediction models using fire/weather indices for input.

The fire/weather index is measured daily at 120 different stations across the province. Stations are located at each MNR district and the data is forwarded to the Regional Offices and then to the Sault Ste. Marie Aviation and Fire Management Centre.

The fire/weather indices, relative humidity, wind and precipitation are used to compute fuel codes (moisture, fine, coarse), rate of spread and intensity. These results are used both as an end product and for the basis of further analysis. The indices are computed for each day, the next day and for several days in the future in order to assist in fire prediction.

b. Values, Values at Risk and Fire Impact

This is basically prefire information on the value of timber, the forest uses, tourist camps, and other data in a given area. Some areas have a higher value than others and must be considered for protection. On the other hand, certain areas may be low risk areas without need of protection. Values at Risk are estimated for various areas of the province to establish priorities for protection from fire.

Fire impact is the net value change in an area from before to after a fire. It is sometimes positive, such as when the intended results are achieved from a prescribed burn to eliminate slash, etc. On the other hand, it is often negative, such as when a mature forest on which a mill depends is burned down and the mill is forced to close down.

This is a relatively new program. The fire impact is generally determined by superimposing fire area or burn over the Forest Resource Inventory data base to determine what quantity and value of timber was lost. In the future, it is intended to digitize the burn area and perform a polygon overlay analysis with a previously digitized forest resource inventory and FORMAGAIN data base to determine the fire impact.

At the present time, only fires covering an area greater than 100 acres are considered for analysis. Of between 1,200 and 2,500 fires per year less than 100 are significant enough to be considered.

A series of maps has been produced called the Forest Fire History Map of Ontario which show the burn area superimposed over existing forest stands.

Sometimes remote sensing imagery is used to determine the limits of burned areas.

c. Fire Weather System

This system provides weather data from 125 MNR fixed weather stations located around the province and also from the public forecast and radio station weather broadcasts.

Another major component of this system is the lightning locator network system operated by MNR. Three networks comprising eleven lightning detector antennas record the location of lightning strikes. The time of strike and direction from several antennas are recorded. An automatic plotting device is used to plot these strikes on a map base and high resolution colour graphics terminals are used to display the location of the strikes. Hard copy plots can be generated in colour from the data shown on the screen using a four-colour dot matrix printer. The lightning data is passed on to Washington, D.C. where it is plotted on a special lightning map produced by Washington.

The Fire Management Group put the weather information and the lightning information all together using a variety of techniques for analysis. The fire weather data is the foundation for calculating indices for the other systems.

d. Fuel Management

This program is not well-defined or established at present. It has been created to deal with fuel hazard management areas (e.g., slash areas, volatile fire areas, dead balsams, etc.). Its purpose is to identify areas which have a high fuel content. This system requires access to forest cover information found in the forest resource inventory records and on LANDSAT imagery. Slope information is also critical, as a 25% slope doubles the rate of speed of the spread of a forest fire.

Currently, no data on combustibility of forest stands is available at the Centre, although it has information on the rate of spread, weather and dead fine (1/4" or less) fuels. Using data on the relationship between the wind, the fine fuel moisture code, the duff moisture code, the drought code and the fuel type, the rate of spread of the fire can be calculated.

The rate of growth of a fire depends on other parameters such as topography (slope), location of lakes and rivers, aspect, and natural barriers such as roads.

e. Fire Information System

This is an inventory of forest fire control reports, an example of which is provided in the **Appendix**. Records are filled out in the field during the fire, and subsequently transferred to Toronto where the data is keypunched and entered onto the computer at Queen's Park. The data is available locally through on-line access to the Queen's Park Computer Centre using EASYTRIEVE. The fire reports provide a record of biological disturbances, and a record of how effectively the Ministry respond to these disturbances.

OBSERVATIONS

The Aviation and Fire Management Centre is in the preliminary stage of developing G.I.S. firefighting tools. It has established a series of lightning detection antennae across the northern part of the province for detecting lightning strikes. The locations of the strikes are recorded and plotted using a Hewlett-Packard plotter.

The Centre co-operates with the Petawawa National Forestry Institute in Petawawa.

FUTURE NEEDS AND WANTS

The Fire Control Unit desires a means of maintaining an up-to-date inventory of cabins and other resources in potential fire areas. On-line access could then provide this data when required during a fire. On-line access to FORMAGAIN and FRI data provides an indication of the fuel, which could be input into a fire model to predict fire behaviour.

Using these data, the Unit envisions the ability to digitize burn areas, captured from aerial photos or by other means, and to perform polygon overlay on FRI stand maps to determine extent of fire area burned and inventory destroyed.

The Unit would also like to have the capabilities to readily access roads, lakes, rivers and structures on a graphics screen at the time when fire occurs, to determine slope and aspect in a fire area, and to retrieve fire report data by township.

G.I.S. POTENTIAL

The Aviation and Fire Management Centre need access to a digital topographic data base with the capability to display pertinent features such as lakes, rivers, roads and structures as well as the physical characteristics of the land such as slope and aspect. The need for digital FRI data is also apparent. Without these fundamental tools, it will be difficult for them to provide some of the models envisioned for fire behaviour prediction and fire suppression.

DATA SOURCE INFORMATION SHEET

TITLE: Telecommunications
Aviation and Fire Management Centre

SOURCE AGENCY: Aviation and Fire Managem.Centre

PERSON: J. Scotland
TITLE: Supervisor
ADDRESS: P.O. Box 310
55 Church Street
Sault Ste. Marie, Ontario
P6A 5L8
PHONE: (842) 942-1800

DESCRIPTION: location of radio communication towers

FORMAT:

	M	A	MEDIA
MAP	x		
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE: NTS sheets & FRI base maps

SCALE: 1:50,000 1:15,840

ACCURACY/RESOLUTION: 50' or 1 second of latitude/longitude

SIZE/VOLUME: from 1,500 to 2,500 fires per year

GROWTH RATE:

DATA ITEMS: tower type and location

RETRIEVAL KEY(S): manual maps

GEOCODE: latitude/longitude

DATE OF CREATION:

FREQUENCY OF UPDATE: as required

COVERAGE/COMPLETENESS: province-wide where required

SOURCE OF INFORMATION: NTS sheets
FRI base maps

USERS OF INFORMATION: fire fighters
Ministry District
Offices and vehicles

VOLUME/FREQUENCY OF USE:

ACCESS METHOD FOR USER: by manual map

AVAILABILITY:

CHARGES:

HARDWARE AND LOCATION: N/A at present

SOFTWARE: N/A at present

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

- DTM required
- DTDB would be of benefit
- provincial digital point map might be of some benefit

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: FIRE ENVIRONMENT PROGRAM

LEGEND:
- ○ MANUAL PROCESS
- ◉ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA							
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1 Fire environment Program								

AGENCY FUNCTIONS	CARTOGRAPHIC DATA						
	GENERATION						STORAGE
	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Fire environment Program		□		□			

AGENCY FUNCTIONS	CARTOGRAPHIC DATA																
	MANIPULATION / ANALYSIS																
	GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1 Fire environment Program	□		□	□			□		◉	◉	◉						

AGENCY FUNCTIONS	CARTOGRAPHIC DATA										
	MANIPULATION / ANALYSIS										
	DIGITAL TERRAIN MODELLING									QUERY	
	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Fire environment Program			□						□	◉	◉

AGENCY FUNCTIONS	CARTOGRAPHIC DATA									
	DISPLAY									
	COMPOSITION					PRESENTATION				
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Fire environment Program	◉	□	□		◉	◉	◉			

AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA					BIBLIOGRAPHIC DATA				REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL		ANALYSIS	DISPLAY			INDEXING	STORAGE	RETRIEVAL		
1 Fire environment Program									●	●							

10.6.1.2 TELECOMMUNICATIONS SECTION

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of the Telecommunications Section at the Aviation and Fire Management Centre is to provide telecommunication services to the Ministry of Natural Resources. Among other things, this involves locating and siting radio and UHF communication towers. Approximately 25 people are employed across the province to perform these services.

TASKS/SYSTEMS

1. Select Sites and Establish Telecommunication Towers

The following tasks are performed by the Telecommunications Section:

(1) Installing permanent and temporary radiostations on request from District Offices. Such radiostations are installed to permit the district to communicate with on-the-road vehicles. The radio transmission towers are located on the highest available points in order to maintain clearer transmissions over as wide an area as possible. Radio transmission tower sites are selected manually, using contour information shown on NTS 1:50 000 scale maps. Land ownership, accessibility and proximity to existing power lines are also key factors considered when choosing a tower site. Old fire towers are used, where available, particulary in remote areas. In remote areas where hydro electric power is not available, solar power is used.

(2) Installing communication relay systems by linking radio and UHF transmission stations. This necessitates that a clear line of sight exists between transmission towers so that signal waves are not impeded. Tower sites are chosen by manually charting potential signal paths on the 1:50 000 scale NTS maps to ensure no obstructions exist between towers. In general, the towers are from 40 to 50 miles apart.

(3) Preparing applications for radio licences for all MNR radio communication installations. Each tower site must be defined by 1 second of latitude and longitude. Co-ordinates are generally derived by scaling from the NTS 1:50 000 scale maps.

OBSERVATIONS

This Unit now operates according to existing manual methods and would benefit from a digital capability. Much of their current workload could be facilitated by having access to digital tools such as DTMs.

FUTURE NEEDS AND WANTS

The Telecommunications Section needs to develop a model which takes into account the topography and other characteristics of the landmass to predict radio transmission coverage from different potential tower sites. A digital terrain model would be most useful for the selection of tower sites. Elevations at the base and top of all towers and the location of the towers with respect to the digital terrain model would enhance these tools.

A capability to determine the geographic and the UTM co-ordinates of a point on a digital map displayed on a graphics screen are desired. The Section needs the ability to touch the point with a light pen or use an electronic joystick or cursor to identify the location of the point on the screen.

The capability to key in geographic or UTM co-ordinate values of a point and display the surrounding topographic and planimetric features on a graphics screen at a user-defined scale would be most useful to the Section. Also, the capability to display on a graphics screen the topographic features which contain a given forest fire would be desirable.

G.I.S. POTENTIAL

A digital terrain model would be of considerable benefit to the Telecommunications Section in that it would expedite the selection of tower sites. This would be particularly beneficial under fire conditions where time is of the essence.

A digital topographic map base together with several G.I.S. computer routines would be of considerable benefit to this Section in locating the position of towers, defining their co-ordinates and in providing a plan of their location.

DATA SOURCE INFORMATION SHEET

TITLE: TELECOMMUNICATIONS
AVIATION AND FIRE MANAGEMENT CENTRE

SOURCE AGENCY: Aviation & Fire Management Centre
PERSON: J. Scotland
TITLE: Supervisor
ADDRESS: P.O.Box 310
55 Church Street
Sault Ste. Marie, Ontario

PHONE: (842) 942-1800

DESCRIPTION: Location of radio communication towers

FORMAT:

	M	A	MEDIA
MAP	x		
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE: NTS Sheets & FRI Base

SCALE: 1:50 000 1:15 840

ACCURACY/RESOLUTION: 50' or 1 second of latitude/longitude

SIZE/VOLUME: From 1500 to 2500 fires per year

GROWTH RATE: Variable

DATA ITEMS: Tower type and location

RETRIEVAL KEY(S): Manual maps

GEOCODE: Latitude/longitude

DATE OF CREATION:

FREQUENCY OF UPDATE: as required

COVERAGE/COMPLETENESS: Province-wide where required

SOURCE OF INFORMATION: NTS sheets
FRI base maps

USERS OF INFORMATION:
- Fire fighters
- Ministry District offices and vehicles
- O.P.P.

VOLUME/FREQUENCY OF USE: N.A. at present

ACCESS METHOD FOR USER: By manual map

AVAILABILITY: Limited

CHARGES: N.A. at present

HARDWARE AND LOCATION: N.A. at present

SOFTWARE: N.A. at present

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

- D.T.M. required
- D.T.D.B. would be of benefit
- Provincial Digital Point Map might be of some benefit

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: **Aviation and Fire Management Centre**

Telecommunications Section

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

			TABULAR DATA								CARTOGRAPHIC DATA																																													IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
											GENERATION						STORAGE	MANIPULATION / ANALYSIS																												DISPLAY																						
																		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	CODO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Select Sites and																◐			◐											◐			◐	◐	◐		◐					◐	◐					◐	◐	◐	◐		◐													
		Establish																																																																		
		Telecommunications																																																																		
		Towers																																																																		

10.6.2 SAULT STE. MARIE DISTRICT AREA PLANNING SECTION

ORGANIZATION AND RESPONSIBILITIES

The Area Planning Section is responsible for developing planning methodologies specific to fire control and forest resource management. In carrying out this mandate, it is necessary to identify both systems and operative processes used to develop land use strategies.

The primary objective of the planning process for a specific area is to develop specific specifications with regard to protection and forest management. The Unit has an R & D role and is carried out by one person.

TASKS/SYSTEMS

There are three tasks of this Unit as follows:

1. Developing Methodologies Specific to Forest Management and Fire Prevention

In developing methodologies, it is necessary to use any existing data to advantage in developing land use strategies. The outcome of any methodology are processes and systems which can be used to produce specifications for a given resource management policy.

2. Application of Methodologies to Specific Areas

The application of a methodology to a given area, consistent with a land use strategy for the area, provides a specification which reflects the impact of protection versus forest management procedures such as prescribed burns. In order to carry out this task, it is necessary to merge two main data sources, namely, fire history data with value expressions for the forest resources. The data sources used in carrying this out include fire reports, as well as data from Parks and Forestry. From the analysis of the data, it is possible to predict a fire expectation index for a given area. It is then necessary to postulate either a fire inclusion or fire exclusion policy for the area. For a "fire potection" policy, every effort is taken to protect the forest and the appropriate levels of fire protection support are provided. For a "fire inclusion" area, less emphasis is placed on fire elimination with nature being allowed to follow its natural course.

In some cases, prescribed burns (typically 50 - 60 yearly) are necessary for site preparation as a prologue to effective forest management.

3. Provide Advice

The Unit also acts in an advisory role for fire management. In this capacity it provides a knowledge base for fire management policies to other interested agencies both within and outside of government, including industry.

FUTURE NEEDS AND WANTS

In order to carry out the planning mandate of the Unit, there is a need to have ready access to a variety of data. This data includes both historical archival data on fire history for areas under study, as well as the existing forest resource inventory, climatic data, forest resource characteristics, and so forth.

There is a need for a structured environment to support this function and to facilitate the deployment of the various methodologies.

OBSERVATIONS

This Unit appears to be concerned primarily with developing and using methodologies which support forest resource management objectives, specifically, from the fire management perspective. In order to properly carry out this task, it is necessary to rely on insight as well as to have good access to a spectrum of data. Fire management policy is a major consideration in the deployment of any viable resource management strategy.

It would appear that this task will be expedited considerably when more information is available in digital format. Since much of the planning task involves the logical examination of scenarios, manual methods are limited. There is a real potential for a digital capability to permit a more thorough analysis of the data, as well as exploitation of methodology.

G.I.S. POTENTIAL

There is substantial potential for carrying out this mandate within a digital environment. Specifically, with the availability of the various data (forest resource inventory, fire history, forest resource characteristics) in digital format, it would be possible to undertake extensive modelling for developing planning methodologies. This could be done using access to existing FRI data and building simple file systems of historical fire data from which a spatial information system could be used for modelling purposes.

A G.I.S. system could also be used to effectively analyse the evolution of a given area in terms of a set of system variable including, for example, environmental, climatic, and resource characteristics.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: AREA PLANNING
Ministry of Natural
Resources (Sault Ste. Marie)

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
	AGENCY FUNCTIONS	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Developing Planning															
	Methodologies															
2	Advising															

		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		GEOMETRIC ANALYSIS													
	AGENCY FUNCTIONS	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	Developing Planning	◐	◐	◐			◐	◐				◐			◐
	Methodologies														
2	Advising	◐	◐	◐	◐		◐	◐		◐		◐	◐		◐

		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
	AGENCY FUNCTIONS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	Developing Planning										◐			◐	◐
	Methodologies														
2	Advising										◐			◐	◐

		CARTOGRAPHIC DATA									
		DISPLAY									
		COMPOSITION					PRESENTATION				
	AGENCY FUNCTIONS	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Developing Planning	◐		◐			◐		◐		
	Methodologies										
2	Advising	◐	◐	◐		◐	◐		◐		

		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	AGENCY FUNCTIONS	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Developing Planning													
	Methodologies													
2	Advising													

10.6.3 TIMMINS REGIONAL OFFICE
LANDS ADMINISTRATION BRANCH
PUBLIC LANDS, MINING LANDS, AND LAND USE PLANNING SECTIONS

ORGANIZATION AND RESPONSIBILITIES

The Lands Administration Branch is divided into three sections: Public Lands, Mining Lands and Land Use Planning. The primary responsibility of the Branch is to maintain accurate and current records of land status and to process any changes in land status as required. There are approximately 8 to 10 staff members who complete the tasks required to fulfill this mandate.

TASKS/SYSTEMS

1. Issues Land Use Permits, Leases, Patents and Licences of Occupation

The Regional Office, Public Lands Section, audits, monitors and provides technical advice to the district offices with regard to public land disposition. Land disposition is initiated at the district level. An application is made for acquisition of a specific land parcel and submitted to the district office. The application describes the location of the parcel by township, lot and concession. The district offices make sure that the specified criteria for land disposition are met before the application is sent to the region for approval of the disposition. Below is a listing of the steps followed in ensuring all conditions and criteria are met:

a. After receiving the application the district office locates the parcel on a control map (M-Plan or G-Plan) to determine if the land is publicly or privately owned and if publicly owned, the current tenure of the parcel (i.e., if there are mining rights only, surface rights, etc. currently on the property) and/or the land index.

b. The parcel and potential use of that parcel, i.e., cottages, commercial, agricultural, etc. is then checked for conformity with the strategic land use plan for that particular district.

c. If a mining claim is on the land parcel and the applicant wishes to use the parcel for agricultural use, etc., a release from the claimer must be obtained.

d. The district office then calls the Mining Recorder at the respective district to ascertain whether there are any recent claims on the parcel that have not been incorporated into the M or G-Plans. If the parcel is not staked, the Mining Recorder and the district office manually superimpose a "bonafide application" symbol on the parcel. This indicates that an application is pending for which a document (patent, lease, licence of occupation, land use permit, easement, etc.) will eventually be issued, providing other approvals are obtained and the applicant complies with the conditions of disposition.

e. The district office then continues with a multitude of checks to ensure the land can be disposed and used for the purpose for which the application was made.

f. The application/ruling is then sent to the regional office for approval and sent on to the provincial head office for issuance of the disposition documents.

g. The district office then manually draws the parcel on M or G-Plans which will serve as the updated map until the survey goes through at the provincial head office and is drafted on the M or G-Plans by MNR Drafting Services.

The district office is also responsible for issuing land use permits. These are special permits for specific land uses such as hay removal, grazing, etc. on Crown lands. The application is made at the district offices and includes the following information:

- applicant's name
- postal address
- telephone number
- age
- occupation
- description of parcel (by lot, concession)
- description of proposed land use
- period of proposed use
- any other public land acquired by the applicant from the Ministry and its tenure

The permits are issued if the proposed land use meets with the strategic land use plan for the district and with various hazard criteria. The district office may stipulate possible conditions which must be adhered to by the applicant. These permits have traditionally been issued for one-year periods but have recently been issued for five-year periods.

The primary responsibility of the Regional Office, Mining Lands Section is to administer and arbitrate for mining exploration in accordance with the Mining Act. The Mining Recorder processes claim applications and issues prospector's licences. Prospectors apply for claim at the Mining Recorder Office and must meet certain criteria which have been clearly outlined in the Mining Recorder Report. As well, the Mining Recorder must check some of the same criteria as the Public Lands Section. After criteria is met, a patent, lease or licence of occupation is issued.

The major difference between the Public Lands Section and the Mining Lands Section deals with the "status" of the applicant. A staker for mining lands is entitled to mining or surface rights until otherwise proven by the Mining Recorder. For public land dispositions the applicant is not initially entitled to the parcel until the district office so determines.

2. Land Use Planning

The Land Use Planning Section helped to develop the strategic district land use guidelines in conjunction with provincial head office. Currently, the Land Use Planning Section is developing detailed area planning for specific zones identified in the strategic district land use guidelines. The prescriptions on more specific sites require enlarged scale mapping for particular zones within the strategic district land use guidelines.

Detailed field work is conducted, data is collected and specific areas are superimposed on any available maps. Manual polygon overlays are conducted to determine site specific land use plans and zoning of particular sites. Such overlays include soils, forestry and wildlife data.

OBSERVATIONS

Much of the work performed by the three sections is of the same nature, and all three sections experience the same types of problems in fulfilling their mandates.

With the various types of patents, leases and licences of occupations symbolized on a map (M or G-Plan), it often becomes very difficult to determine which lands are Crown or privately owned. The status of land parcels with respect to possible land use permits, reserves, etc. affecting them as well as wildlife information, park lands, timber types, etc. is not currently plotted on an M or G-Plan. These must be separately overlaid on the parcel to determine any impediments to the disposition.

Much of the data required to determine if the applicant has met all criteria is often not easily obtained or displayed on maps in varying scales (i.e., the data is physically located in another building). Co-ordination of data and easy accessibility will permit greater efficiency and speed in processing dispositions.

For many applications, including site-specific land use planning and public land disposition, data must be displayed on maps at small scales. Scale change capabilities, however, are not always readily available.

Generally speaking, the districts and regions work on a township basis. Maps are thus required in a township window display. Current OBM coverage is considered of high quality and adequate for many of the district and region applications, with the exception that they are not available on a township basis.

Ensuring data is current with respect to patents, leases, licences of occupation, land use permits, etc. is essential, yet often difficult to obtain. The regions and districts would benefit from an immediate update of data in both graphic and tabular form. Most of the district offices currently have Apple computers which will be used for storing of land use permits. The district office has a DEC 3 minicomputer for automating office procedures and maintaining a transaction log for public land dispositions.

FUTURE NEEDS AND WANTS

The Lands Administration Branch would like to have immediate update of their graphic products. This could be available in an on-line capacity if the map data were available digitally. The Branch would also like to have user-specified polygon overlay. With this, they could overlay various criteria that are pertinent to a particular application and determine the suitability of the parcel for the applicant's land use.

In providing a digital graphic product, the Section would like to window out on a township basis as well as on a smaller site basis to perform its land use planning. It would use this capability in answering public queries at the district offices where many public enquiries are related to particular land parcels. The Section also needs the ability for scale change of graphic products. The Branch would like access to other data bases including timber, soils, wildlife, etc. in order to conduct its polygon overlay.

The Branch would also like on-line access to determine the recency of surveys from the Surveys and Mapping Branch in head office.

G.I.S. POTENTIAL

The Lands Administration Branch would like to automate many of their geographic planning functions. In fulfilling their mandate, access to current data such as timber, soil type, wildlife, geology, etc. is essential and, thus, the Branch would benefit from integration into a G.I.S. system where data updates could be completed on-line.

The following cartographic data manipulation functions are currently done manually; however, a great deal of time and effort could be saved if a digital map and G.I.S. system were available:

- polygon overlay
- polygon dissolve
- point in polygon
- buffering/corridoring
- proximal analysis
- line length calculation
- area/perimeter calculation
- spatial and attribute query

These functions are required for site planning and determining parcel suitability for land use permits and changes in land tenure.

The Branch would also like to have the capability of producing a variety of user-specified maps. The Branch would window out particular townships or sites and selectively choose environmental overlays in order to facilitate the planning process. Scale change is required for displaying one or more parcels in greater or less detail as required.

Finally, the Branch would benefit from the capability of automatic update for parcels with respect to recording new land use permits against specific parcels.

DATA SOURCE INFORMATION SHEET

TITLE: Land Use Permit Files

SOURCE AGENCY: District Offices

PERSON: District Manager

TITLE:

ADDRESS:

PHONE:

DESCRIPTION: - inventory of all land use permits issued in a particular district

FORMAT:

	M	A	MEDIA
MAP			
TABULAR	X		
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 1,800 permits

GROWTH RATE: 0

DATA ITEMS: name of applicant, postal address, description of parcel (lot, concession), description of land use, date of use

RETRIEVAL KEY(S): applicant name, parcel description

GEOCODE: lot, concession, address

DATE OF CREATION:

FREQUENCY OF UPDATE: monthly

COVERAGE/COMPLETENESS: district

SOURCE OF INFORMATION: applications

USERS OF INFORMATION: mining lands (head office and district), public lands (head office and district)

VOLUME/FREQUENCY OF USE: several times a week

ACCESS METHOD FOR USER: over-the-counter query, manual file retrieval to be automated

AVAILABILITY: general

CHARGES: none

HARDWARE AND LOCATION: file cabinet at district office

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.) to be automated

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

District Office -
Public Lands

LEGEND:
- ○ MANUAL PROCESS
- ◉ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA: GENERATION						STORAGE
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Issuing land use permits, leases, patents and licence of occupation									□	□		◉			◉
2 Land use planning	○			○			□		□	□		□			◉

AGENCY FUNCTIONS	MANIPULATION / ANALYSIS: GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1 Issuing land use permits, leases, patents and licence of occupation	◉		◉	◉		◉	◉		◉	◉	◉						
2 Land use planning	◉		◉	◉		◉	◉		◉	◉	◉						

AGENCY FUNCTIONS	MANIPULATION / ANALYSIS: DIGITAL TERRAIN MODELLING									QUERY	
	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Issuing land use permits, leases, patents and licence of occupation										◉	◉
2 Land use planning										◉	◉

AGENCY FUNCTIONS	DISPLAY: COMPOSITION					PRESENTATION				
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Issuing land use permits, leases, patents and licence of occupation	□		□	□	◉	□		□		□
2 Land use planning	□		□	□	◉	□		□		□

AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Issuing land use permits, leases, patents and licence of occupation			○										
2 Land use planning			○										

11 MINISTRY OF REVENUE

11.1 OVERVIEW

The Ministry of Revenue administers the province's major Taxing Statutes, the Guaranteed Annual Income System for Senior Citizens (GAINS), Ontario Tax Credits, Ontario Tax Grants for Seniors, Small Business Development Corporations, the Property Assessment Program, and the Province of Ontario Savings Office.

To carry out this mandate a number of programs and divisions have been created. The program relevant to this study is the Property Assessment Program.

Under the Assessment Act, the Property Assessment Program provides for the valuation of all real property at market value for local government assessment and taxation purposes and for an equitable basis of assessment for the distribution of grants. It also administers the municipal enumeration function.

11.2 ASSESSMENT SERVICES DIVISION
DATA SERVICES AND DEVELOPMENT BRANCH
ONTARIO ASSESSMENT SYSTEM (OASYS)

ORGANIZATION AND RESPONSIBILITIES

The Assessment Services Division has the mandate, under the Assessment Act, to provide for the valuation of all real property at market value. This valuation is used for local government assessment and taxation purposes, and for an equitable basis of assessment for the distribution of grants. It also administers the municipal enumeration function. The Data Services and Development Branch of the Assessment Services Division is responsible for assessment information management, including the supply of computer data services to assessors, municipalities and school boards. It is responsible for developing new assessment and data processing systems.

There are over 5,000,000 unique "assessment units" in Ontario that require ongoing data collection, updating and evaluation processes.

The Data Services and Development Branch has a systems staff of 15 people that interface with the Management Systems Branch on behalf of the provincial assessment operation.

The Data Services and Development Branch's principal client, in terms of systems support, is the Field Operations Branch. It employs 2,100 people in 31 assessment offices across Ontario. This staff produces the assessment notices and assessment rolls annually for 837 municipalities and 125 separate school boards with taxing authority within Ontario. Each of the assessment offices has an Assessment Commissioner and two major subordinate functional entities:

(i) **Valuation Managers** (Property Assessors). Each assessor has from 2,500 to 3,000 properties to administer and the properties are usually within one contiguous area.

(ii) **Administration and office services staff whose duties include:**

Land titles registry research and co-ordination - Research land titles transactions as they affect property and use the data as a basis of establishing assessment maps and tabular files for assessors use.

Assessment mapping support - Create and modify property-related maps to augment the accuracy of property extent within a geographical area. This product helps the assessors in establishing field cards and other reference material and minimizes "lost territory".

TASKS/SYSTEMS

1. Maintain OASYS System

The information system of the property assessment program is given the acronym OASYS (Ontario Assessment System). This is a batch-oriented system and contains pertinent data on all assessment units in Ontario. Approximately 135 data elements are kept for a single family, owner-occupied property. The principal reference key for transactions is the 19-character assessment roll number which is coded by county, municipality, map, sub-map and parcel.

Information on new assessible units and updates to existing units are collected by the field assessment offices and sent to head office for conversion to digital format and entry into the OASYS system.

The OASYS system is used to produce tax notices, which are sent to property owners in late November of each year, and a complete assessment roll on a form and/or on a magnetic tape if requested by the taxing authority. The individual taxing authorities set their individual mill rates and produce their own tax invoices.

The OASYS system runs at the Queen's Park Computer Centre, and has an annual operating cost of $1 million for data processing and an additional $3 million for postage.

The OASYS system is in the process of being upgraded to an on-line inquiry system with on-line update capability. It will use Model 204 as the data base management system. The provincial government teleprocessing network will be used to connect the head office to the 31 field assessment offices. It is intended to allow municipalities direct access to the data base via an extended terminal network. The upgraded system is targetted for province-wide implementation by December, 1985.

2.. Assessment Mapping Support

On the average, there are three mapping technicians in each of the 31 field assessment offices. The principal function is to update and maintain assessment maps.

The mapping support staff research land titles transactions as they affect properties and update the maps accordingly. They assign new assessment roll numbers, if necessary. The mapping is done by manual drafting and scales and accuracy vary with location. Approximatley 85% of the landmass in Ontario is now defined on assessment maps.

OBSERVATIONS

On-line OASYS is a quantum step in the processing of assessment data in Ontario. Each assessment office has had a major degree of autonomy and consequently the standardization and quality of assessment maps vary with each locale since the quality depends on what priority the individual in charge of each assessment office assigns to the mapping operation. Some offices, such as York, have excellent parcel maps.

All assessment maps are in imperial units. The metric problem, by itself, could justify an in-depth analysis of the potential use of alternate (digital or otherwise) mapping techniques.

The assessment mapping function may be discontinued if POLARIS maps (Property Index Maps) become available for the entire province.

FUTURE NEEDS AND WANTS

An alternate method of distributing tax notices to reduce the current $3 million postage costs is desired by this Branch.

Acceleration of the process of establishing the provincial teleprocessing network is needed to enable assessment offices to use OASYS data base by December, 1985.

Digital parcel maps for all properties in Ontario is also desired to facilitate updating and maintenance of assessment maps.

G.I.S. POTENTIAL

A pilot project by the Ministry of Natural Resources could attempt to develop digital property index maps and provide direct access to an assessment field office. This could determine the feasibility of a centralized electronic repository of property maps accessible to all assessment offices.

The Ministry of Revenue represents potentially the largest user of digital parcel maps in the Ontario Government. There is broad potential for use of G.I.S. procedures. Tabular data entry and update procedures would be used and cartographic generation and storage techniques such as compilation, digitizing/editing, update, map join and storage/management. Various types of geometric analysis to be used include polygon overlay to portray new construction areas, polygon dissolve, point in polygon, transformations, buffering to determine affected properties, windowing, and area/perimeter analysis to calculate assessment areas. The full range of composition procedures, as well as polygon mapping, would also be used.

DATA SOURCE INFORMATION SHEET

TITLE: Ministry of Revenue

SOURCE AGENCY: Data Services & Development Br.
PERSON: W.J. Baxter
TITLE: Director
ADDRESS: 33 King Street West
6th Floor
Oshawa, Ontario
L1H 8H5
PHONE: (416) 433-5677

DESCRIPTION: Ontario Assessment System (OASYS) supporting Ontario assessment record keeping and preparing Tax Rolls for Municipalities

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 5,000,000 assessable units

GROWTH RATE: Approx. 5%

DATA ITEMS: 135 unique fields and codes (on average) for a single family residential property

RETRIEVAL KEY(S): Assessment Roll number

GEOCODE: County/Municipality

DATE OF CREATION: On-going

FREQUENCY OF UPDATE:

COVERAGE/COMPLETENESS: Province-wide

SOURCE OF INFORMATION: Assessment Office Records and field cards from 37 provincial assessment offices

USERS OF INFORMATION:

-Most Provincial Ministries
-Minicipal Governments
-Utility Companies

VOLUME/FREQUENCY OF USE:

-Annual tax roll for Municipalities
-Ad-hoc requests from other users

ACCESS METHOD FOR USER:

-Magnetic tape transfer of tax roll to municipalities
-Written request by other users

AVAILABILITY: Non-confidential items & codes are available. Planned on-line access by 1985
CHARGES: Nil

HARDWARE AND LOCATION: IBM hardware at Datacrown

SOFTWARE: Model 204 DBMS

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE: MINISTRY OF REVENUE

SOURCE AGENCY: Assessment Mapping

PERSON: Lou Stadelman

TITLE: Quality Control Officer

ADDRESS: 33 King Street West
6th Floor
Oshawa, Ontario
L1H 8H5

PHONE: (416) 433-5677

DESCRIPTION: Property Assessment Mapping

FORMAT:

	M	A	MEDIA
MAP	x		Chronoflex
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: Varied

ACCURACY/RESOLUTION: Varies by office

SIZE/VOLUME:

GROWTH RATE: No. of maps hardly change. No. of units on maps change approx. 5% per year

DATA ITEMS:

RETRIEVAL KEY(S): 19-digit I.D. (roll number)

GEOCODE: County/municipality

DATE OF CREATION:

FREQUENCY OF UPDATE: On-going

COVERAGE/COMPLETENESS: Province-wide

SOURCE OF INFORMATION:
- Assessment office records
- Land Titles and Registry Office records
- Assessment field cards

USERS OF INFORMATION:
- Most Provincial ministries
- Municipal Governments
- Utility Companies

VOLUME/FREQUENCY OF USE: Not quantified

ACCESS METHOD FOR USER: Request to Assessment office using 19-digit key for individual mapsheet

AVAILABILITY: Maps available with disclaimer

CHARGES: Nil

HARDWARE AND LOCATION: N/A

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: MINISTRY OF REVENUE

Data Services & Development Branch

LEGEND:
○ MANUAL PROCESS
● NOW DONE MANUALLY WANT TO AUTOMATE
◐ AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

			TABULAR DATA							
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
AGENCY FUNCTIONS	1	OASYS	○	●	●	●	●	□	□	●
	2	Assessment Mapping	○	◐	◐					

			CARTOGRAPHIC DATA						
			GENERATION						STORAGE
			COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
AGENCY FUNCTIONS	1	OASYS							
	2	Assessment Mapping	◐	◐		◐	◐		◐

			CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS													
			GEOMETRIC ANALYSIS													
			POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
AGENCY FUNCTIONS	1	OASYS														
	2	Assessment Mapping	◐		◐	◐	◐	◐	◐		◐		◐			

			CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS													
			NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
			OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
AGENCY FUNCTIONS	1	OASYS														
	2	Assessment Mapping														

			CARTOGRAPHIC DATA – DISPLAY									
			COMPOSITION					PRESENTATION				
			QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
AGENCY FUNCTIONS	1	OASYS										
	2	Assessment Mapping	◐	◐	◐	◐	◐	◐				

			IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
			COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	OASYS													
	2	Assessment Mapping													

12 MINISTRY OF TOURISM AND RECREATION

12.1 OVERVIEW

The Ministry of Tourism and Recreation delivers policies and programs to support tourism and recreation development and promotion through its two divisions: the Tourism Division and the Recreation Division.

The Sports and Fitness Branch, which is one component of the Recreation Division, has overall responsiblity for sports and fitness programs. Two parallel consulting units provide assistance for provincial sport governing bodies and athletes.

The Sports Development Unit comprises programs for coaching development, amateur games and the sport achievement awards, among others.

The Fitness Services Unit provides assistance to community agencies and industry in order to increase personal fitness, and operates provincial programs for fitness promotion, education and leadership.

12.2 SPORTS AND FITNESS BRANCH COACHING PROGRAM

ORGANIZATION AND RESPONSIBILITIES

The primary responsibility of this Section is to administer the National Coaching Certificate Program (NCCP) for the Province of Ontario. There are three parts to the certificate program, the technical, the practical and the theory of coaching development. This Section is involved with the theory-level instruction for coaches. This program is administered by three persons.

TASKS/SYSTEMS

1. Administer the NCCP Program

The Coaching Program Section is notified through a completed questionnaire of coaches who have taken courses administered by this Section. The questionnaire contains such items as name of coach, permanent address of coach, date of birth, sex, education level, type of coaching, sport actively coaching and sport in which the person wishes to be certified. There is also a regional code included which relates to the Sports and Fitness regions. A sample of this questionnaire is contained in the Appendix.

This questionnaire information is entered into a computer system by staff in Ottawa. The Ottawa data base is for all of Canada; however, this Section only deals with the Ontario portion of the data base. This Section receives a printout of the inventory of all coaches that have registered in the program. There are approximately 40,000 coaches on file.

There are six sports and fitness regions in Ontario. The Section queries the data base for the number of coaches within a particular region in order to determine the need for augmenting course instructor staff or promoting the coaching program in particular regions.

Another data base has been created which is an inventory of the approximate 400 course instructors who instruct the potential coaches.

OBSERVATIONS

This Coaching Development Program is linked to the Coaching Association of Canada, which is associated with the National Sports and Recreation Centre. Currently, the Coaching Association of Canada maintains the data base for all of the provinces. However, since the Ontario data base is by far the largest, there is a pilot project currently being undertaken which would make this Section responsible for maintaining its own data base. In this regard, there is a terminal in the office at 77 Bloor Street West which the Section can use to update its own data base and retrieve information. At this time, there is no facility to generate reports or inventory listings. These listings are still sent to the Section from Ottawa.

A problem exists in co-ordinating this program with the other Sections involved. For example, the Sports Section which deals with the technical and practical aspects of coaching development is based on different regional components than the portion of the program dealing with the theory aspects of the NCCP. The program developers are moving toward standardizing the regions and having everyone use the same six regions for the coaching development system.

FUTURE NEEDS AND WANTS

The major need in this Section is to establish standard regions and have everyone involved with the program use these standards as well.

G.I.S. POTENTIAL

The present system based on the six administrative regions is adequate in aiding this Section to fulfill its mandate. Further access to a Geographical Information System would not enhance its administrative responsibilities.

DATA SOURCE INFORMATION SHEET

TITLE: Coaching Development System

SOURCE AGENCY: Coaching Development Section
PERSON: Jan Godfrey
TITLE: Assistant Coaching Co-ordinator
ADDRESS: 77 Bloor Street West
Toronto, Ontario

PHONE: (416) 965-6546

DESCRIPTION: an inventory of coaches who have participated in the National Coaching Certificate Program

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION:

SIZE/VOLUME: 40,000 records

GROWTH RATE: minimal

DATA ITEMS: coaches name and address, phone number, region, date of birth, sex, education level, type of coach, sport actively coaching, sport in which the applicant wishes to be trained

RETRIEVAL KEY(S): coaches name, region

GEOCODE: region

DATE OF CREATION: 1972

FREQUENCY OF UPDATE: several times a week

COVERAGE/COMPLETENESS: Ontario

SOURCE OF INFORMATION: application form

USERS OF INFORMATION: internal to Sports and Fitness Section and Coaching Association of Canada

VOLUME/FREQUENCY OF USE: once a week

ACCESS METHOD FOR USER: through generated reports and on-line access

AVAILABILITY: general

CHARGES: none

HARDWARE AND LOCATION: Hewlett-Packard 4, Ottawa, Ontario

SOFTWARE: unknown

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Coaching
Development
System

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1	Administer the NCCP Program	○	●	●	●	●	●	●	●							

AGENCY FUNCTIONS		CARTOGRAPHIC DATA																
		MANIPULATION / ANALYSIS																
		GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1	Administer the NCCP Program				●													

AGENCY FUNCTIONS		CARTOGRAPHIC DATA																				
		MANIPULATION / ANALYSIS											DISPLAY									
		DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION				
		SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1	Administer the NCCP Program																					

AGENCY FUNCTIONS		IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Administer the NCCP Program													

13 MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

13.1 OVERVIEW

The Ministry of Transportation and Communications is responsible for the planning, design, construction and maintenance of Ontario provincial highways. It provides subsidies for municipal roads and transit, and is also responsible for policy development for the province's air, rail and marine programs.

In addition, the Ministry of Transportation and Communications (MTC) is responsible for driver vehicle and carrier licensing, driver regulation, compliance enforcement of inter-city buses, for-hire truck transportation vehicle weight, commodity type, vehicle safety and co-ordination of road safety for the province. It represents Ontario citizens with respect to communications rights, and regulates telephone service under provincial jurisdiction.

Several divisions and offices within MTC develop and use land-related information. Among these, five particular organizational activities are relevant in this study:

- the Highway Engineering Division, Surveys and Plans Branch and Cartography Section,
- the Office of the Assistant Deputy Minister, Engineering and Construction Property Office,
- the Office of the Assistant Deputy Minister, Provincial/Municipal Transportation, Land Use Analysis Group,
- the Office of the Managing Director, GO ALRT Program, and
- the Capital Projects Branch, Linear Highway Referencing System.

Each of these programs are described in the sections which follow.

13.2 HIGHWAY ENGINEERING DIVISION

13.2.1 SURVEYS AND PLANS OFFICE

ORGANIZATION AND RESPONSIBILITIES

The Ministry of Transportation and Communications has recently started a program to investigate the various options available for using a CADD system for road design.

The primary motivation for this task was to seek ways of introducing high technology into the traditional road design process. This is seen as a means for being able to accommodate the inevitable staff cut-back as well as for becoming abreast with new mainstream technology. Much of the motivation has also come from consultants working for MTC.

SYSTEMS/TASKS

1. Conduct Engineering Design

MTC is involved with many project-oriented road design tasks. These involve many aspects of road design, including planning road alignment, engineering design, earthworks, etc. At present, the head office is responsible for setting design standards, while the five regions are responsible for actual design and drafting.

A major aspect of engineering design is the creation of digital terrain models from 1:3 000 photographs for design at scale of 1:500. This photography gives a vertical pointing accuracy of ± 10 cm, which is acceptable for producing cross-sections used for payment purposes.

MTC is involved with both planimetry and cross-sections for its engineering works. These are separate activities within the current structure.

At present, MTC is looking at automated engineering design packages to facilitate its design functions. Specifically, the following packages are being explored:

a) MOSS, a British engineering design system based on a co-ordinated ground modelling system with particular strength in interchange design.

b) RDS (Road Design System) used by a number of U.S. highway departments, which works on centre lines and offsets, with particular strength in new alignment design.

c) System 050 which is specific to MTC standards and also operates on a centre line and offset with strength in reconstruction and widening.

It is anticipated that MTC will structure a digital engineering design system based on a single system or a combination of the above three systems.

2. Produce Digital Base Maps

In carrying out engineering design, MTC uses mapping at scales of 1:2 000 for planning and 1:500 for design using the 3 degree MTM projection.

OBSERVATIONS

Most of MTC's activities are project-oriented, and are essentially self-contained. MTC undertakes all of its own extensive control on a project basis. There is still an emphasis on the use of the 3 degree MTM projection because of its planar qualities necessary for accurate engineering design and for easier design layout in the field.

MTC's past experience with digital mapping is interesting, in that, since they have created and maintained digital map data, little subsequent use has been made of the digital data in design activities.

At present, both planimetric maps and cross-sections are produced separately. However, tests are under way to evaluate the accuracy of cross-sections interpolated from digital terrain models.

The data used for each project is never updated or amended to reflect changes. Thus, whenever construction updates are necessary, it is often quicker and cheaper to provide new mapping for the project, rather than update old mapping.

There is limited use of OBM mapping, due to the difficulties in reconciling co-ordinate data to different adjustments and projections, and the fact that MTC designers are used to roll plans oriented along the highway alignment as a base for the production of contract drawings.

FUTURE NEEDS AND WANTS

Digital mapping has been justified so far, solely on the time and manpower savings to produce the graphical base. However, with the development and institution of digital road design, digital survey data will become the prime product rather than a by-product of mapping.

G.I.S. POTENTIAL

At this time, there is limited G.I.S. potential for this unit of MTC. With the creation of a digital road design system, there is a potential to store the road data (specifically the alignment) within a comprehensive data base for potential use by other agencies. With the new total station approach of MTC as with the existing aerial survey system, there is a potential to build a comprehensive land data base for digital terrain models.

DATA SOURCE INFORMATION SHEET

TITLE: MTC Digital Map Base

SOURCE AGENCY: MTC

PERSON: Mr. B. Turner

TITLE: Co-ordinator CAD Systems

ADDRESS: Highway Engineering Division
1201 Wilson Avenue
Downsview, Ontario M3M 1J8

PHONE: (416) 248-3249

DESCRIPTION: the digital map base is an inventory of tapes resulting from the production of highway plans through the photogrammetric mapping process and the use of IAG Systems. These are used as bases and background information for design drawings.

FORMAT:

	M	A	MEDIA
MAP		X	tapes
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1:500
1:2 000
1:10 000

ACCURACY/RESOLUTION: standard plotting accuracy

SIZE/VOLUME: *several thousand models

GROWTH RATE: approx. 1,200 per year

DATA ITEMS:
- planimetry which includes natural and man-made features
- contours

RETRIEVAL KEY(S): highway number and photography number from index

GEOCODE: 3 degree grids and co-ordinates

DATE OF CREATION: 1970

FREQUENCY OF UPDATE: the maps are not updated, rather remapping is carried out

COVERAGE/COMPLETENESS: approximately 20%

SOURCE OF INFORMATION: aerial photography

USERS OF INFORMATION: MTC Regional Planning and Design Sections

VOLUME/FREQUENCY OF USE: daily for hardcopy plans
- infrequent use of the digital information

ACCESS METHOD FOR USER: to utilize the tapes a request would be made to the Computer Services Branch of the MTC which would obtain the tape from the Highway Engineering Division

AVAILABILITY: restricted - the public can look at the maps but cannot take them away

CHARGES: N/A

HARDWARE AND LOCATION:
- Gerber flatbed light beam plotter
- planimap & stereo digitizers
- CORK IAG Systems
- laser scan HRD 1 display/plotter for editing offline

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

*There is no standard mapsheet size. It may vary according to project

- This Division does not maintain the final hardcopy plans, rather they are filed at the Regional Offices.
- At present the IAG approach is not yet in production mode for highway engineering design purposes.
- This Division stores the film negatives & prints used for map production.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

MTC Digital Base Map

Branch: Surveys and Plans

Division: Highway Engi- Engineering

Ministry: Transportation and Communications

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

			TABULAR DATA								CARTOGRAPHIC DATA																																													IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
											GENERATION						STORAGE	MANIPULATION / ANALYSIS																														DISPLAY																						
																		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / [redacted]	ADDRESS GEOCODING	STORAGE/[redacted]	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Producing Digital Base Maps	○	●		○	●	●		●	●	●	●		●		●					●	●	●	●	●									●	☐						●		●	●	●	●	●	●	●	●	●	●	●	●	○	○	○										

13.2.1.1 REMOTE SENSING AND AERIAL SURVEY SECTION

ORGANIZATION AND RESPONSIBILITIES

The operational aspects of aerial surveying and remote sensing reflect the regional office structure whereby the actual functions (as per mandates) are carried out in the field offices wherever possible. This structure is supplemented with the Headquarters Section which carries out tasks which cannot be readily performed in the field because of costs or are specified to be a headquarters function. Specifically, Headquarters is responsbile for monitoring activities of the regional offices as well as undertaking all of the aerial survey activities because of high equipment cost.

The Photogrammetry and Remote Sensing Section encompasses four units with a total staff complement of about 30. Each unit shares some of its mandate in common with all other units, namely:

1. To maintain and update existing and develop new policies, standards, specifications and other operational documents necessary for the conduct of program delivery and associated activities.
2. To develop in-house and/or evaluate and incorporate external, new technologies, systems, materials, equipment, procedures, etc.
3. To carry out, when necessary, pilot projects to evaluate feasibility, practicality and cost benefits of innovative methodologies and solutions.
4. To assess the merits and appropriateness of regional innovative initiatives and co-ordinate such activities.
5. To organize and/or conduct, when required, seminars and other activities to disseminate information, transfer technology or impart the necessary training to Ministry personnel and others as appropriate.
6. To prepare for presentation, distribution and publication reports and papers on innovations and developments.

Each unit also has a unique set of responsibilities as follows:

A. Aerial Survey Section

1. To produce engineering base plans at various scales and contour intervals for the Ministry.
2. To produce photogrammetrically measured profiles and cross-sections for design purposes.
3. To produce a digital terrain data base for input to geometric programs which generate interpolated cross-sections, earth worth

quantities and in line with optimization.

4. To obtain vertical aerial photography for mapping and non-mapping purposes.
5. To provide digitizing, interactive editing and lightbeam drafting capabilities for various special purpose data referencing projects.
6. To develop new technological applications to aerial survey systems and provide expert technical advice in areas of photogrammetry and computer graphics.

B. Remote Sensing Section

1. To monitor, on random basis or as otherwise appropriate, the pertinent activities and products in areas where operational government documents are applied and systems are used.
2. To identify deficiencies and inadequacies, etc. of existing government documents and systems and undertake appropriate actions.
3. To identify deviations from current policies, procedures and advise the appropriate authority of the same and recommend corrective measures, when necessary.
4. To compile and analyse for the Program Manager information and data generated and supplied by regions on quantity of outputs and resources use, i.e., efficiency of operational activities.
5. To provide, on request, individual or as part of working groups, expert input, advice, clarificational guidance to regions, Head Office and others as necessary and appropriate.
6. To provide, on request, mosaics and image library services to Head Office, regions and others.

This Section also is complemented by:

a. Systems Engineers/Analysts to provide systems and programming support for this Section.

b. Photogrammetric Scheduling and Products Co-ordinator who is responsible for liaison with companies for contract work as well as co-ordinated activities with the regions.

c. Remote Sensing Engineer who in turn has responsibility for special remote sensing projects, supervising a Senior Remote Sensing Technician and an Image Librarian.

With decentralization, many of the functions such as planning, field survey, design, remote sensing, etc. are relegated to the regions. Aerial survey cannot be decentralized and is maintained at Head Office. The Section at Head Office also provides assistance to other government agencies as well as co-ordinates and assists the regions with their tasks.

There is continued reorganization because of changing functions and technology.

The annual budget for this Section is in the order of $2 million. This has been supplemented in the past with special funds such as the GO ALRT Project. In the past year, this has amounted to approximately $600,000 for aerial mapping.

SYSTEMS/TASKS

1. Remote Sensing

The primary purpose of the remote Sensing Section is to gather and interprete data. Each region has its remote sensing unit which is responsible for providing the ground work for any imagery required. The imagery is typically provided by Head Office. Requests are initiated by the regions when they cannot handle the tasks within their own offices.

The Remote Sensing Unit operates independent from CRS. Since its emphasis is primarily on photography at scales of 1:500 to 1:1 000, this Unit is involved with considerable experimentation to evaluate and improve new technology for incorporation within their own mandate areas.

The program delivery functions for remote sensing include:

1. planning
2. design
3. geotechnical
4. maintenance
5. legal
6. special projects
7. image library
8. preparational mosaics

The Remote Sensing Unit is also responsible for policy procedures and standards development. In this capacity it is necessary to:

1. Carry out surveillance by remote sensing of environmental impacts.
2. Provide information necessary for resolving legal disputes.
3. Develop procedures for monitoring and ascertaining the payment performance.
4. Monitor the regional program delivery functions.
5. Training.

The Remote Sensing Unit also provides technical liaison with a number of associated agencies including:

1. The Ontario Centre for Remote Sensing.
2. The Canada Centre for Remote Sensing.

3. National and international universities.
4. Provincial, national and international transportation agencies.
5. The Ontario Association of Remote Sensing.

The Remote Sensing Unit has used a variety of remote sensing imagery. Both in an operational capacity as well as in an experimental mould. These include:

1. conventional black and white photography;
2. conventional colour photography;
3. infrared black and white photography;
4. infrared colour photography;
5. multiband photography; and
6. thermal infrared scanning.

The primary emphasis is still on photography as this is found to be the most cost-effective solution consistent with the mandate of the Unit.

Also, the work that is carried out by the Remote Sensing Unit is for the regions; however, work is also performed for other government agencies and for municipalities on a decreasing priority basis.

2. Aerial Survey

The Aerial Survey Section provides a variety of products from input derived from ground control and photogrammetry. Most of the products are graphic products in the form of strip mapping with very little block mapping.

Various products produced by the Aerial Survey Section include:

1. Photogrammetric engineering plans. These small scale plans which are used for topographic study plans are drawn at scales of 1:10 000 with a 5 m contour interval. Most of the planning and preliminary design plans are drawn at a scale of 1:2 000 with a 2 m contour interval. The design and contract drawings are drawn at a scale of 1:500 with 1/2 m contour interval.

2. Digital terrain models. The digital terrain models are produced like computer programs which take data from the 1:2 000 planning drawings and 1:500 design drawings to interpolate cross-sections and calculate cut field values. The digital terrain models are also used to optimize alignments for new highways. The digital terrain models are also a method of payment for contractors where payment is related to quantity.

3. Photogrammetrically measured cross-sections. More accurate cross-sections are produced from 1:500 mapping models for file design and for the accurate derivation of design quantities. It is these quantities that are used for payment to contractors.

4. Vertical and oblique aerial photography. An extensive library of photography is maintained for engineering purposes. Most of the photography is strip photography, specifically for MTC's own needs.

The photography is also used for a number of non-mapping interpretative uses such as training and traffic studies.

The Aerial Survey Section has been involved with digital mapping for many years. The system employed was based on blind digitizing for digital stereographic compilation. This system has since been replaced by new equipment based on the KORK system which incorporates similar components, namely, digital interface to stereo compiler, keyboard entry for specification of features and the storage of data on secondary storage devices. In the older system, the data was stored on a magnetic tape, whereas the data is now maintained on floppy discs. The new system differs from the old primarily in terms of capability as well as providing an interactive graphic screen. This screen is a raster colour graphic screen produced by Mitsubishi and is used to depict those features which have been digitized by the operator. The system is still in the proving stage; however, it is expected to replace all of the existing digital equipment used by aerial surveys in the past.

The dataflow for this Section is very much the same. The data which is derived from digital stereo compilation is transferred by means of floppy discs to a larger PDP11 computer where it is organized in terms of structured files. The data is then formatted for display on the larger scale laser scan plotter. The data is plotted and any deviations from the actual design are corrected using a laser scan editing capability. When the design is complete diazo is produced from which live scale plans can be derived automatically. These are then compared with the original photograph to ensure consistency. Further editing, if required, is done on the laser scan display. When the design is completed the data is formatted for plotting on a Gerber 31 plotter with a photospot projector.

MTC has a variety of design and engineering programs which it uses in conjunction with its digital terrain data.

OBSERVATIONS

MTC has a long involvement with digital mapping with extensive experience. They have managed to make good use of the digital technology as a means of expediting their own mandate. They have also constantly sought to improve the process of providing large scale mapping and design to a technological innovation. As such, they have been recognized leaders in digital mapping for the province.

Most of the mapping requirements for MTC are large scale and strip mapping. The Aerial Survey Section is self-contained in that it is designed, primarily, to meet MTC's needs which are very specialized. The Remote Sensing Unit, on the other hand, provides services to other government agencies as well as municipalities on a low-priority basis.

Because of the highly accurate nature of MTC's mandate, MTC still uses the 3° MTC grid for all of their mapping. There is limited use of the OBM map except for initial topographic filing purposes.

FUTURE NEEDS AND WANTS

Most of the MTC's needs are met internally. The Aerial Survey Section could, however, benefit from either horizontal or vertical control to facilitate its targetting. MTC maintains good liaison with other agencies, such as OLRS and CCRS as well as a variety of other government agencies. It is expected that these links will provide better information as each Unit becomes more sophisticated in executing its mandate.

G.I.S. POTENTIAL

The Aerial Survey and Remote Sensing Sections both make extensive use of G.I.S. functions at this time. Many of these are of direct interest only to MTC and are represented in terms of extensive software investment. These Sections could benefit from the availability of other land-related information in digital format, primarily for planning purposes. However, it is more than likely that much of the data that is currently maintained by MTC in digital format could be of value to other potential users such as municipalities, etc. Some of the information in more generalized format could be of interest to less specialized users. In order to achieve this, it would be necessary to have the capability for generalizing information and make it available in standard format for use by other agencies.

13.2.2 CARTOGRAPHY SECTION

ORGANIZATION AND RESPONSIBILITIES

This Section has a staff of eight, including one Section Head, one Cartographic Supervisor, five senior Cartographers and one Information Processor. This permanent staff complement is augmented with summer students and contract staff as required.

This Unit has been producing the official road maps since 1923. It is still their mandate to produce medium and small scale transportation maps. The official road map is a multicoloured product produced on a periodic basis.

This Section also produces a variety of multicoloured and black and white medium scale map series for both the Ministry and public use. As well, they provide cartographic services to the Ministry of Transportation and Communications and other ministries for base maps (e.g., MNR, Ministry of Health, Conservation Authorities, counties, etc.). A variety of cartographic digital data is also provided on demand to other units within the ministry and to outside organizations.

The Cartographic Section is located only at headquarters because of the nature of its mandate and the difficulty of providing this service in the regions in a cost-effective manner.

SYSTEMS/TASKS

1. Produce Road Maps

In carrying out its mandate, the Section provides a variety of graphic products, which include:

a. The Official Road Map of Ontario

The Official Road Map of Ontario is produced every two years under the direction of the Ministry's Map Committee. The maps are drawn at scales of 1:800 000 for Southern Ontario and 1:600 000 in Northern Ontario. The primary purpose of the map is to provide a schematic representation of the major road networks as well as to depict tourist and travel features in conjunction with roads and settlements. A selection of features to appear on the map is determined by a set of criteria established by the Map Committee.

b. County, District and Regional Municipality White Print Road Network Maps

This map series is designed to depict the total road network on a county, district or regional basis. Each map shows the basic township graphic with lot and concession numbering and township names. Municipal lot boundaries as well as the transportation systems are also shown. There are 16 full-colour maps drawn at a scale of 1:250 000 to cover Southern Ontario. This series is currently being redesigned and the number of maps will be reduced to eight and will become known as Ontario Transportation Map Series.

c. County, District and Regional Municipality White Print Maps

This map series is drawn at two scales, 1:63 360 for maps covering counties and regional municipalities, and 1:126 720 for maps covering districts and municipalities in Southern Ontario. The maps are essentially identified as the lithograph map series, except that they provide greater detail as well as show the lot and concession lines. There are 74 maps in a series. This map series is also available at half scale (1:126 720 and 1:253 440). This map series is revised periodically when staff are available. Approximately one man-month is required to complete each map.

d. Custom products including Thematic Maps

The Section is involved directly in the design and production of thematic maps. In the past, these maps have included the Airport Facilities Map, Ontario Telephone Service Commission Map as well as a variety of others. Update and maintenance of these maps is determined by the requesting agency.

The Section provides a variety of cartographic services for the Ministry of Transportation and Communications as well as a variety of other federal, provincial and local agencies. These include:

- **Base Map Preparation** - A variety of base maps are prepared, including cartographic design and filmwork. For specific requests, the end user is charged a minimal cost for reproduction of graphics.
- **Map Base Film Preparation** - Duplicates of map base films and current MTC products are made available to both government agencies as well as public users of the information. An appropriate charge is levied for these services.
- **Miscellaneous Graphics and Photographic Services** - A variety of graphic products such as report covers, overlays for presentation, etc. are provided on an "as per request" basis.

The Section also supplies on demand up-to-date compilation information regarding the provincial road system to private mapping firms and government agencies without charge.

2. Maintain Cartographic Data Base

The Section maintains a digital cartographic data base system. This is essentially a formatted data file consisting of 8,000 to 9,000 records, one for each settlement in Ontario. Each record is stored as a card image and contains 15 fields, including:

1. settlement name
2. region
3. county
4. feature type
5. latitude and longitude
6. agency providing the signs
7. criteria
8. map side
9. population
10. page
11. Ontario Road Map grid
12. dwellings
13. availability of food
14. availability of fuel
15. availability of accommodation

This information is utilized in the preparation of the road maps, and is also of value to industry and tourism. The system runs on an IBM 370 as an interactive application using TSO.

OBSERVATIONS

This Section has been very effective in producing cartographic products for a long period of time. Its primary purpose is to service the road transportation network needs of MTC. However, it also provides a variety of services to other government agencies, both provincial and municipal.

It is interesting to know that they provide a wide variety of map bases for other map users; also, the Unit has a flexible policy with regard to selling its reproduction material at very low cost.

The Section has experimented with digitizing some of its cartographic products in the past. These experiments were not particularly successful, primarily because of the blind digitizing involved. The system used was that which was available in the Aerial Survey Section. This system was designed specifically for a variety of applications and could not readily accommodate the needs of the Cartographic Section. However, with the availability of new hardware in the Aerial Survey Section, it is expected to again examine the feasibility of using four digital resources in the provision of their products.

FUTURE NEEDS AND WANTS

The Section has carried out extensive studies with regard to the application of computer graphics to cartography. From this, it is ascertained that it would be desirable to have a computer graphics system for each of the six basic steps involved in the production of cartographic products, both multicoloured and monochrome. These stages are:

1. compilation
2. design
3. filmwork
4. proofing
5. final films
6. final products

For the compilation phase, it is recognized that a computer graphics system would provide a facility for capturing not only graphics information but a variety of associated information items related to the features. The data base required would have to be an extension of the cartographic data base stored on the IBM mainframe using sequential files and accessed by TSO. There is a need to provide a continual update of this data base.

The computer graphic system is envisioned as a necessary tool for map design. It is anticipated that the data that would be maintained could be consistent with the notions of data base methodology. A variety of graphic products could be derived on demand and viewed before the final design is accepted.

In order to be an asset for filmwork, a computer graphics system with associated data base must be augmented by a photohead plotter. This is required to provide reproduction material directly on film. The graphic images must be capable of dealing with film basic type, namely, linework, point symbols, area symbols, and type.

During the proofing stage, there is a need to be able to provide a variety of editing functions to ensure that the resulting graphic is of high graphical quality. This process is currently very time-consuming in a manual system, and it is expected that a graphics system would clearly facilitate this operation.

It is anticipated that the production of final films for base maps purposes will be derived directly from the edited display files produced directly from the cartographic data base.

G.I.S. POTENTIAL

It is clear that this Section has given considerable thought to the creation of a cartographic digital data base. The diversity and the wide variety of products that they provide make them a clear candidate for the production of high quality graphics for cartography. Even though this is primarily a cartographic activity, attribute information associated with the cartographic data should be available from the associated files within the cartographic data base.

Some of the automated tools which this Section would find useful include tabular data compilation, entry and update for maintaining their cartographic data base, and cartographic data generation, storage and display tools for producing road maps.

DATA SOURCE INFORMATION SHEET

TITLE: Road Maps of Ontario

SOURCE AGENCY: Cartography Section, MTC
PERSON: Mr. T. Wood
TITLE: Head, Cartography Section
ADDRESS: 1201 Wilson Ave.
Downsview, Ontario
M3M 1J8

PHONE: (416)968-3248

DESCRIPTION: A series of maps delineating MTC Highway system in Ontario.

FORMAT:

	M	A	MEDIA
MAP	X		paper, mylar
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE: 1:800 000 1:126 720
1:1 600 000
SCALE: 1:250 000
1:63 360

ACCURACY/RESOLUTION: Base derived from NTS maps and therefore reflect NTS map accuracy

SIZE/VOLUME: *

GROWTH RATE: N/A complete series available

DATA ITEMS:
- administrative features
- cultural features
- map surround
- transportation (air, marine, rail, road)
- topographic (drainage, relief)
- travel and tourist features
- city

RETRIEVAL KEY(S): name of area mapped, such as "South Central Ontario" and inventory number

GEOCODE:
- latitude and longitude
- road map grid
- new map series used 6^{o} UTM grid for 1:250 000

DATE OF CREATION: 1923

FREQUENCY OF UPDATE: 2 to 5 years depending on map series

COVERAGE/COMPLETENESS: all mapping for Southern Ontario exists except for very small road maps

SOURCE OF INFORMATION:
- MNR, NTS maps for base
- MTC for transportation data
- Townships
- other direct sources such as railway companies for rail data, etc.

USERS OF INFORMATION:
- general public

all levels of government and private sector

VOLUME/FREQUENCY OF USE: several times a day

ACCESS METHOD FOR USER:
- query at government map offices (MNR and MTC)
- some maps are sold through the private sector

AVAILABILITY: general

CHARGES: small scale road maps-no charge
all other maps-$1.50

HARDWARE AND LOCATION: originals are kept on file in MTC offices

SOFTWARE: cartographic digitization has been developed to maintain settlement information

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

* TYPE	SCALE	# OF MAPS
Official Road Map	1:800 000	1
	1:1 600 000	1
County, District & Regional municipality maps	1:250 000	16
	1:126 720 1:63 360	74

DATA SOURCE INFORMATION SHEET

TITLE: Cartographic Data Base

SOURCE AGENCY: Cartography Section, MTC
PERSON: Mr. T. Wood
TITLE: Head, Cartography Section
ADDRESS: 1201 Wilson Ave.
Downsview, Ontario
M3M 1J8

PHONE: (416)968-3248

DESCRIPTION:

A data base developed in-house to maintain settlement (ie. cities, towns, villages, and unincorporated settlements) data for compiling road maps.

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		X	disc
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: positional accuracy to the nearest latitude and longitude second.

SIZE/VOLUME: 6,200 records

GROWTH RATE: 200-300/year

DATA ITEMS:

- settlement name
- region, county
- feature type
- latitude/longitude
- agency providing the signs
- criteria which qualifies settlement to go on the map
- map side
- population
- page
- Ontario Road Map grid
- dwellings
- availability of food, fuel and accomodation

RETRIEVAL KEY(S):

- any of the data itmes
- use of boolean logic
- by windowing

GEOCODE: latitude and longitude, reference grid on map

DATE OF CREATION: 1976

FREQUENCY OF UPDATE: daily

COVERAGE/COMPLETENESS:

Ontario

SOURCE OF INFORMATION:

- Ontario Geographic Names Board
- Ministry of Intergovernmental Affairs for population data
- MTC
- municipal offices

USERS OF INFORMATION:

- MTC cartographic section
- Ministry of Northern Affairs
- MNR

VOLUME/FREQUENCY OF USE: several times daily

ACCESS METHOD FOR USER:
- T.S.O.
- batch processing
- print out

AVAILABILITY: general

CHARGES: none

HARDWARE AND LOCATION: IBM mainframe, Downsview

SOFTWARE:
- Assembler
- in-house developed Data Base

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

CARTOGRAPHIC SECTION, MTC

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA							
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1	produce road maps								
2	maintain cartographic data base	◐	◐	◐	●	●	●	●	●

AGENCY FUNCTIONS		CARTOGRAPHIC DATA																				
		GENERATION						STORAGE	MANIPULATION / ANALYSIS													
									GEOMETRIC ANALYSIS													
		COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1	produce road maps	◐	◐		◐	◐	◐	◐														
2	maintain cartographic data base																					

AGENCY FUNCTIONS		CARTOGRAPHIC DATA													
		MANIPULATION / ANALYSIS													
		NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1	produce road maps														
2	maintain cartographic data base														

AGENCY FUNCTIONS		CARTOGRAPHIC DATA										IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		DISPLAY																						
		COMPOSITION					PRESENTATION																	
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	produce road maps	◐	◐	◐	◐	◐	◐	◐	◐		◐			○										
2	maintain cartographic data base																							

13.3 OFFICE OF THE ASSISTANT DEPUTY MINISTER, ENGINEERING AND CONSTRUCTION PROPERTY OFFICE POLICY AND LAND MANAGEMENT SECTION

ORGANIZATION AND RESPONSIBILITIES

This Section is concerned with the policy regarding land owned by the Ministry, excluding lands for the highway system. It is specifically interested in excess lands, and is responsible for managing, leasing and disposing of such lands. The Office also has a mandate regarding the acquisition of lands for transit purposes. This function has since been decentralized to the regions.

SYSTEMS/TASKS

1. Maintain MTC Land Records Data

The Ministry of Transportation and Communications has a complete description of all land holdings. These are recorded by the Information Services Section on a Cardex system. The information contained includes a plan number and the means of land acquisition (for example, by deed or by expropriation). Much of this information is now maintained by the Title Records Section. The information is shown on Title Records Plans, which are essentially coloured maps as well as Engineering Title Plans which show the access paths, and provide a pictorial view of land holdings.

It should be noted that the head office provides for policies, procedures, monitoring, budget and training, while the activity associated with land management is delegated to the regions.

This Office also maintains information with regard to other sites such as gravel pits. The Ministry has title to many other gravel pits which they use, e.g., in Northern Ontario under the Transportation and Highway Improvement Act, the Ministry can take Crown land for its use. Once its use has been satisfied, the land must be given back to the Crown (MNR).

2. Automated Land Management Inventory System

This Office maintains a complete inventory of all excess lands. Except for land acquired for some patrol yards, all other lands are acquired by MTC. Often there are pieces left after the purpose for which the land was purchased is satisfied. For example, in order to put in a highway it is often necessary to buy a complete farm. Pieces that remain after the highway is constructed must be sold off, wherever possible.

In some cases, the land is maintained for a variety of reasons or during an interim period. Under these conditions, it is necessary to provide for social maintenance such as providing a grant to the municipality in lieu of taxes, weed control, fences, etc.

The automated inventory system contains all serviced lands including service centres, patrol yards, picnic sites, gravel pits, etc. There is one record for each piece of land. The data items that are found within each record include the file number, lot, concession, registered plan number, municipality, highway, etc. The data can be sorted by file number, the township or municipality as well as highway and size, and other items.

The Section expects to convert this from a tape-oriented system to an on-line system for on-line inquiry. A pilot system using FOCUS has been developed and conversion will be completed in the near future.

At present, there are 8,543 excess lands including surplus lands. The system is maintained in five regions, however, access is available to head office. Data is available for producing a variety of standard reports. Some of the information found on the files is confidential data such as the appraised value of the property.

OBSERVATIONS

It would appear that this Office, which consists of a staff of three people, is concerned primarily with developing policies and procedures as well as monitoring the activities of the regions. Many of the functions they perform are land-related, and as such, they would benefit from the availability and access to a G.I.S. system. There is a move towards maintaining much of the information in digital format. Thus, the Section is experimenting with high level tools such as FOCUS, and has devised prototype data bases from which the staff can ascertain how to approach its problems.

There is a need for a good liaison between the regions and head office. An on-line system capability would be of great value in achieving this end. At this time, there is some use of maps. However, there is a great need to have access to information maintained by other ministries and agencies.

FUTURE NEEDS AND WANTS

There is a need to gain access to the Registry Office data. Sales data, title information and assessment data, for example, is needed by appraisers to ascertain the market value for specific properties. There is a need to obtain better access to all of the information for the appraisers, including date of instrument, size of the transaction (area), legal description and sale price.

There is a need for on-line inquiry for rapid access to current information.

It is desirable to have hard copy of parcel data.

Much of the work that is currently being undertaken by the Ministry could be better performed with the availability of a generalized query language which would allow the definition of windows and searches for a property description within a specific window. There is a specific need for selective retrieval, such as the ability to search properties which are adjoined by other properties.

A lot of other land-related data is required in carrying out this Section's mandate. As such, it would be desirable to expedite access to this information including information re deeds, easements, and owners data, including companies information. Specifically, when the land is owned by companies it is often necessary to look for the directors of the companies.

G.I.S. POTENTIAL

Since many of the activities performed by this Office are land-related, a G.I.S. system would be of great value to this Office and to five regional offices. Such a system would facilitate access and retrieval of land-related information; specifically, a system would be useful in identifying parcels which fall within certain administrative areas and all have common features such as common owners. Within the comprehensive geographical referencing system, this Office would be able to ascertain the disposition of surplus lands and their possible use. As many of its functions are of a planning variety, there is a potential to facilitate their mandate through the use of a G.I.S. system.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: OFFICE OF ASSISTANT DEPUTY MINISTER,
ENGINEERING & CONSTRUCTION

PROPERTY OFFICE

LEGEND:
○ MANUAL PROCESS
⊕ NOW DONE MANUALLY WANT TO AUTOMATE
◉ AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

		TABULAR DATA								CARTOGRAPHIC DATA						
										GENERATION						STORAGE
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
AGENCY FUNCTIONS	1	Maintain MTC Land Records Data	◉	◉	◉	◉	◉	◉	◉	◉							

		CARTOGRAPHIC DATA																											
		MANIPULATION / ANALYSIS																											
		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
		POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
AGENCY FUNCTIONS	1	Maintain MTC Land Records Data																											

		CARTOGRAPHIC DATA										IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
		DISPLAY																						
		COMPOSITION					PRESENTATION																	
		QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Maintain MTC Land Records Data																						

13.4 PROVINCIAL/MUNICIPAL TRANSPORTATION POLICY PLANNING BRANCH TRANSPORTATION DEMAND FORECASTING OFFICE LAND USE ANALYSIS GROUP

ORGANIZATION AND RESPONSIBILITIES

The Transportation Demand Forecasting Office consists of four groups: Highway Planning Support, Data Co-ordination, Multi Modal Group, and Land use Analysis Group.

The mandate of the Land Use Analysis Group is to determine demand estimates of the various highway systems; for example, the GO ALRT program. The estimates are used in the design of traffic facilitites. The Multi Model Group also supplies assistance to municipalities in planning of their transit route requirements.

SYSTEMS/TASKS

1. Determine Demand Estimates of Highway Systems

In carrying out its mandate, the Transportation Demand Forecasting Office makes extensive use of models. There are a number of models in use, such as the TARMS (Toronto Area Regional Models Study) Model. This model has a number of inputs including the distribution of population, employment, square footage of shopping space, major attractions, such as airports, etc. Using this model, MTC has developed a transportation zone system covering approximately 400 transportation zones within Metro.

Other models are provided for various regions. There are, for example, 1,300 zones between Oshawa and Hamilton. For each land area a variety of data is maintained such as population and employment statistics.

The data sources for these models include local municipalities and the Statistical Services Branch of the Ministry of Treasury and Economics. Each municipality maintains some of its own transportation model data. In this model, the municipalities use the same zone system as MTC. Data collected by the municipal planning departments is made available to MTC for their own studies. The Statistical Services Branch of the Ministry of Treasury and Economics provides demographic data projections as well as a number of other factors such as fertility rates, migration patterns, etc.

In carrying out its mandate, this Group also experiments with development patterns within the province in order to anticipate troubles. Planning data, local data and so forth are available from a variety of sources including local planners and industrial development commissioners. This information is complemented with geographic information in the form of "origin - destination" surveys which use the MTC zone coding, and population estimates for the various zones. This information can be aggregated to higher levels.

The planning activity is conducted in the five MTC regions as well as the Metro Toronto area. Information is maintained for each of the regions in local data banks. Specific data that is maintained include population, employment data, etc. The data is updated and maintained in Toronto. For smaller municipalities, information is obtained by looking at development patterns such as those provided by the county planning boards.

In addition to providing input to regional models, the Land Use Analysis Group also provides consultant services to the municipalities. In this capacity, it assists municipalities in planning for its own transportation needs.

The Land Use Analysis Group is also a clearing house for socio-economic matters within the transportation context. In this capacity, it reviews public documents, such as the GO ALRT projects. The Group has developed two scenarios for land use which are economy and lifestyles. This was done by IBI Consulting Engineers.

This Group also performs monitoring and produces a variety of reports. Specifically, these reports examine information that is made available from the Ministry of Treasury and Economics.

OBSERVATIONS

In the planning of transportation networks, this Group makes extensive use of maps, including land use and development plans as well as the depiction of various zones on maps. The Group also plots networks on schematics, using the MTC road maps at 1 inch = 1 mile and 1 inch = 4 miles.

Much of their effort is expended in running and improving a variety of transportation models which were developed at MTC. These models are very large and are very expensive to run.

With the recent fiscal constraints, the Group is now down to a staff of four. This was not unexpected, in light of the fact that there is less activity in planning for road facilities. The primary effort is directed towards maintaining current information about the use of the road system for future extensions and modifications.

FUTURE NEEDS AND WANTS

The Group would like to see more of the traffic analysis done at the municipal level. This would involve developing more specific models for the municipalities, much like those developed for managing the strategic plans maintained by MTC.

There is a need to gain access to municipal data bases for more relevant and up-to-date trend data, e.g., employee data. There is a need for additional and improved economic base data, specifically, related to districts. There is also a need to gain access to data from other sources such as the MARS data base.

This Group would benefit from G.I.S. systems, such as the GIMM system used by Statistics Canada. Much of the data that is currently available from Statistics Canada would be of great value to this Unit in producing planning studies. At present, approximatley 50% of staff time is spent in collecting data with the remaining 50% spent conducting analysis. By having access to good sources of up-to-date information, they would be able to perform more effectively and within a shorter timeframe.

There is a need to have on-line access to a variety of smaller data bases for specific studies. To this end, various other data systems are being developed, such as census driver/vehicle files. This file maintains driver and vehicle data which can be aggregated to various levels for study. The data is used for vehicle forecasting. Presently, approximately 150 fields of data exist for the Toronto area. Much of the data is derived from the census tape. This information is useful in providing very specialized studies, such as in journey to work data for Statistics Canada.

The Group would like to perform a number of smaller studies, if access were available to a variety of data files associated with their specific needs. In this capacity, they could ascertain the relevant factors which affect their transportation models.

G.I.S. POTENTIAL

There is considerable G.I.S. potential for this Group since their function is predominantly one of planning and they rely extensively on the availability of a G.I.S. system. Much of the data that they currently use is derived from the Statistics Canada tape and would be of greater use if they had a system similar to the GIMM system of Statistics Canada. There is limited need for the supply of information on maps; however, with the availability of better data, more analysis programs could be run, including network analysis for traffic flow and planning, etc.

DATA SOURCE INFORMATION SHEET

TITLE: Provincial Transportation Zone System Maps (PTZ)

SOURCE AGENCY: Transportation Demand Forecasting Office MTC

PERSON: Mr. P. Suokas

TITLE: Supervisor Land Use Analysis

ADDRESS: 2nd Floor, West Tower
1201 Wilson Avenue
Downsview, Ontario

PHONE: (416) 248-3795

DESCRIPTION: a series of maps based on MTC produced county maps utilized for traffic zone studies

FORMAT:

	M	A	MEDIA
MAP	X		paper
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1" = 1 mile
1" = 2 miles

ACCURACY/RESOLUTION:

SIZE/VOLUME: approximately 100

GROWTH RATE: N/A

DATA ITEMS:
- roads
- rivers
- township, municipal and county Boundaries
- date of revision

RETRIEVAL KEY(S): via county code number

GEOCODE: latitude & longitude
5-digit code
2 county
1 municipality & 2 for within the municipality

DATE OF CREATION: 1974

FREQUENCY OF UPDATE: as required for such items as boundary changes

COVERAGE/COMPLETENESS: entire province

SOURCE OF INFORMATION: MTC

USERS OF INFORMATION:

MTC - Transportation Demand Forecasting Office
MTC - Regional Offices

VOLUME/FREQUENCY OF USE: several times a month

ACCESS METHOD FOR USER: manually kept file

AVAILABILITY: open

CHARGES: N/A

HARDWARE AND LOCATION: filing cabinets at MTC head office

SOFTWARE: N/A

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

data maintained for each of the zones are maintained on computer files. This data such as census data is obtained from other ministries and that generated by the MTC

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

Land Use Analysis Group

Transportation Demand
Forecasting Office
MTC

Contact: Mr. P. Suokas
Supervisor Land
Use Analysis

LEGEND:
- ○ MANUAL PROCESS
- ◐ NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- □ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA: COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1 Determine Demand Estimates of Highway Systems	●	●	●	●	●	○	●	●

AGENCY FUNCTIONS	CARTOGRAPHIC DATA – GENERATION: COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE: STORAGE/MANAGEMENT
1 Determine Demand Estimates of Highway Systems	○			○	○	○	○

AGENCY FUNCTIONS	MANIPULATION / ANALYSIS – GEOMETRIC ANALYSIS: POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Determine Demand Estimates of Highway Systems	●			●		●	●		●					

AGENCY FUNCTIONS	NETWORK ANALYSIS: OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	DIGITAL TERRAIN MODELLING: SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	QUERY: SPATIAL QUERY	ATTRIBUTE QUERY
1 Determine Demand Estimates of Highway Systems	●	●	●										●	●

AGENCY FUNCTIONS	DISPLAY – COMPOSITION: QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	PRESENTATION: POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Determine Demand Estimates of Highway Systems	○			○	○	○	○	○		○

AGENCY FUNCTIONS	IMAGE DATA: COLLECTION	STORAGE	RETRIEVAL	TEXT DATA: ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	BUSINESS GRAPHICS DATA: ANALYSIS	DISPLAY	BIBLIOGRAPHIC DATA: INDEXING	STORAGE	RETRIEVAL	REFERENCE TO DATA TYPES
1 Determine Demand Estimates of Highway Systems			○					○	○				

13.5 OFFICE OF THE MANAGING DIRECTOR GO ALRT PROGRAM, OAKVILLE AND PICKERING

ORGANIZATION AND RESPONSIBILITIES

GO ALRT is a special office which was created in the fall of 1982 to study ways to update the GO Transit system in the Lakeshore corridor. In 1982, a study was conducted by Delcan to examine various GO options along the Lakeshore in the CN right of way. The objective was to examine possible new corridors for new technology to handle increased traffic along this corridor. The outcome of this study was a recommendation for a separate right of way. It was also recommended that the best technology to use was the ALRT (Advanced Light Rapid Transit) technology of UTDC (Urban Transportation Development Corporation). The study also identified that other provincial objectives could be satisified at the same time, including the decentralization of Toronto into a number of new city centres. A rapid transit system would be necessary for inter-regional transit.

The area under consideration is north of the 401 to Steeles Avenue stretching from Oakville to Pickering.

The primary objective of this Office is the design and planning for the GO ALRT system with a perspective into the next century. There are many phases of the project, with initial consideration being given to route location. An objective of the GO ALRT system is to connect the new city centres via an inter-regional rapid transit system.

SYSTEMS/TASKS

1. Planning and Design of GO ALRT Corridor

The GO ALRT Northern Section can be seen as a multi-phase project. During the first phase of the project, the primary objective is to identify a possible route. For this analysis, it is necessary to work within the Environmental Assessment Act and to consider the social and environmental consequences for a variety of specific routes.

In the first phase, the project has involved extensive data collection as a means of conducting a mini-feasibility study. This is being done by contract with Marshall Macklin Monaghan, with the objective to provide an overview study of the area. The study is taking a quick look at the whole study area and compiling as much data as is appropriate for the identification of various route options. This stage is also expected to identify potential problem areas and to create some form of insight into the quality and quantity of data that is available and necessary for the study,.

Upon completion of the initial data collection phase, a subsequent corridor analysis phase will be undertaken. During the first phase, considerable coarse data has been collected which will be refined in detail in the next phase. During the corridor analysis study, it is expected that a specific corridor will be singled out.

Extensive analyses will be required to ascertain the feasibility of the corridor. Some of the considerations used in the analyses include: noise, vibrations, trees, and so forth. The various routes will be analysed and evaluated with regard to a wide range of impacts on urban design, natural environment, ease of transit operations, cost, etc. During this phase, it is expected to build a data base to detail the specific alignment for the route selected. Consideration has been given to use a G.I.S. methodology for this phase.

To carry out the study, mosaics at 1:10 000 and 1:2 000 scale are required as well as new mapping at 1:2 000 for environmental and assessment considerations. The detailed designs will be done on 1:500 scale mapping.

The ultimate output of the study will be the designation of the route as well as plotting it on the landscape. It will then be registered in order to ensure that the alignment is respected in any further land development for this area. It is expected that a natural consequence of this phase will be that the land development priorities will change to reflect the specific alignment chosen.

It is expected that the route will be built in sections when it is implemented. The Project Office is expected to enter into detail design in preparation of contract drawings. The Office will act in a supervisory capacity in working with various contractors for carrying out the objectives of the project. It should be noted that this Office is concerned with the preparation of design specifications.

OBSERVATIONS

This project is a major undertaking. The rationale for the project is that its scope is too large for any one municipality, and as such the province must be responsible for co-ordination. Also, each municipality has a limited perspective, while the province is concerned with optimizing local objectives with inter-regional transit. The project is to be phased over a number of years with the mandate of this Office to oversee its development. MTC has considerable experience in managing projects of this magnitude, although the anticipated implementation cost of this project will be in excess of $2.2 billion.

This Office has examined the possibility of using a G.I.S. system for carrying out much of its analyses. At this point in time, it is uncertain whether a digital solution will be selected, primarily, because of an internal uncertainty in using this technology. This, however, need not be a problem since the digital solution would have corresponding manual products associated with it and hence there is a natural fall-back on the manual approach to this type of project.

Perhaps the greatest need for a digital solution is the employment of a CADD system for the detailed design.

FUTURE NEEDS AND WANTS

Even though no specific needs and wants were identified in detail for this project, it is clear that a set of tools and resources are necessary for achieving their objective. These range from analysis programs for route selection, optimization, alignment as well as detailed design capabilities. Perhaps the most pressing need at this time is the development of a comprehensive set of specifications which can be carried out throughout the lifetime of the project and are independent of these specific technologies chosen to implement the project.

The basic requirement for this project is to have a good set of comprehensive maps which cover the area in question in a variety of scales. These will range from 1:10 000 for developing a comprehensive data base from which a variety of geographical analyses could be conducted to 1:2 000 drawings for environmental assessment and 1:500 for detail design. At present, OBM maps are being prepared in this area at a scale of 1:10 000.

G.I.S. POTENTIAL

The GO ALRT Program would benefit from a vast array of automated G.I.S. procedures. With access to a G.I.S., the Office would like to carry out tabular and cartographic data management procedures, various types of geometric and network analyses, digital terrain models, queries, displays, image data retrieval, and text and bibliographic data management procedures.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE:

GO ALRT Program, Northern Section, Oakville and Pickering

Ministry of Transportation and Communications
Frank Norman, P. Eng.
Project Director
3625 Dufferin Street
Downsview, Ontario

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS

	TABULAR DATA							
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1 Planning and Design of GO ALRT Corridor	☐	☐	☐	☐	☐	☐	☐	☐

	CARTOGRAPHIC DATA						
	GENERATION						STORAGE
	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Planning and Design of GO ALRT Corridor							☐

	CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS													
	GEOMETRIC ANALYSIS													
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	CLIPPING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Planning and Design of GO ALRT Corridor	☐		☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

	CARTOGRAPHIC DATA – MANIPULATION / ANALYSIS														
	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Planning and Design of GO ALRT Corridor	☐	☐	☐		☐				☐	☐	☐	☐	☐	☐

	CARTOGRAPHIC DATA – DISPLAY									
	COMPOSITION					PRESENTATION				
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Planning and Design of GO ALRT Corridor	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Planning and Design of GO ALRT Corridor			☐	☐	☐	☐	☐			☐	☐	☐	

13.6 CAPITAL PROJECTS BRANCH
LINEAR HIGHWAY REFERENCING SYSTEM

ORGANIZATION AND RESPONSIBILITIES

The Linear Highway Referencing System was developed by the Ministry of Transportation and Communications and introduced for common use in 1977. The system provides a common referencing framework for land-related data in terms of a topological network. It is used specifically for referencing a variety of file systems including traffic accidents, traffic volumes, and highway inventory data.

TASKS/SYSTEMS

1. Maintaining the Linear Highway Referencing System (LHRS)

The LHRS is a unique form of referencing for land-related information. All the data items are referenced with respect to a grid of intersections of all highways with other highways and secondary roads.

The basic data elements within this system are the key reference points. These are points of intersections of highways with other highways and secondary highways. Each point is uniquely referenced by a 5-digit number. The numbers are in sequence along the road. Each highway is described as travelling either east to west or south to north. Highways on a diagonal are made to be equivalent to either east to west or south to north roads. These reference points are a means of describing the network of the transportation system. Between any two points is a section of highway. Since these sections may be long, it is necessary to have secondary reference points. The secondary reference points typically reference intersections of county and regional roads with highways. These secondary reference points are described in terms of tenths of kilometres from the primary network of noted points and have the effect of producing a smaller referencing grid.

This system is used by a variety of organizations, including the Ontario Provincial Police for referencing position on the highway network. An accident location is described in terms of the basic reference, which is the distance from a reference point at which an accident occurred.

2. Description of System

The system has been implemented on a large IBM mainframe. It consists of a number of VSAM files and a set of associated processing programs, all of which have been written in PLI. The primary purpose of this collection of programs is to maintain a basic reference network. The network is maintained in terms of a historical perspective.

The data base is created out of a set of highway keypoints which are selected based on their relationship to the transportation network. The keypoints start sequentially in memory with respect to their sequence number.

A section would be defined between two consecutive keypoints. All the secondary points are referenced with respect to the keypoints defining the sections, and are found under the appropriate keypoint items. For example, all secondary points found under the section of highway between keypoints 10,300 and 10,310 would be listed in sequence under the associated keypoint file. A variety of feature points have been associated with the sections such as boundaries, structures, railway crossings, etc. These are recorded in sequence in the file and classified accordingly. A number of data items are associated with each entry in the file, including:

1. LHRS number
2. section distance
3. offset distance
4. description
5. opening date
6. closing date
7. various reference data items

There are approximately 3,000 active keypoints in the file, which must be constantly updated. The update cycle is performed monthly. The information for changes comes from a variety of sources. The data that is entered into the data base are historical archives, and is also kept within the on-line file. The file is kept for a period of approximately four years, which exceeds the 2-year period required for some of its uses, such as accident reports.

The feature point information can be construed to constitute layers on the data base. The following data items can be described by features in the data base. These are:

1. MTC regional boundary
2. MTC district boundary
3. county/regional boundary
4. township boundary
5. OPP district boundary
6. provincial electoral riding
7. county/regional roads
8. township roads
9. other local roads
10. structures
11. railway crossings, etc.

The data base is able to accommodate a variety of different users, so that new information can be added readily simply by extending the coding system.

The data base is currently used to produce a variety of reports. After each update, copies of the data base are produced in terms of computer listings and sent to the associated agencies within the MTC, such as the Accident Referencing Section, Provincial Police, and so forth. The listing provided is essentially an up-to-date inventory of what exists in the data base. Specific reports can be produced on request.

It should be noted that the data base does not maintain the individual data items for the application areas. This data base is, for all intents and purposes, a referencing system which may be used by the application areas to provide data reference points for their own data items. For example, data for the accident file is maintained in a separate file system. Each accident is referenced with respect to the keypoints within the LHRS system. Before the data is put into the accident file, each location reference is validated by passing it against the LHRS file to ascertain whether it is valid or not. In this sense, the LHRS system provides a valid reference for data items found in other file systems.

This system is rather extensive and has been built over a number of years. The system has been developed totally in-house and represents an investment of approximately 10 man-years. There are approximately 3,000 keypoints in the file with a total of approximately 7,000 records. There is little growth in terms of new keypoints being added, however, there are some changes being made constantly to the file and hence the number of records will increase accordingly. The file is currently approximately 25 Megabytes in size. The access keys to the file are LHRS number and date.

The system is organized as a hierarchical file system, although it has network characteristics because of the extensive use made of pointer variables. The system is built using VSAM files with variable length records.

3. Other Data Base Components

A photo inventory of each highway section was built up over a period of time. The last film that was made was in 1981. However, because of financial restraints, this particular program is now stopped. There is considerable interest in this capability for handling legal claims. When the program was in operation, the southern part of the province would be photographed in one year, with the northern part being completed the following year. As well, as each section of the province was done, it would be completed in the reverse direction on alternate times.

This Branch has also made extensive use of aerial photographs. These are used primarily for referencing ramps for freeways and interchanges. The accident data for ramps is maintained separately, and the aerial photographs provide a better referencing vehicle for describing such accidents.

OBSERVATIONS

The LHRS appears to be a very powerful data base which is not being used to its full potential. Inherently, it is a topological network which is used to reference the transportation network. As such, it is being used by those agencies which rely on the transportation network, such as the Provincial Police for accident reporting as well as transportation companies.

The data items within the associated file systems do not keep co-ordinate positions. Consideration has been given to incorporating this information when space is available within the file. Perhaps it has not been kept because there has not been an obvious need for it. However, the value of the file would have been enhanced considerably if this information were available. At present, there is very little analysis for data using this referencing system. This is because the system is essentially a referencing tool and as such does not maintain any data items.

LHRS appears to be an in-house data base totally under control of MTC. There is no external access at this time, and it is unlikely that one would ever be required since an updated version of the data base is provided monthly to those agencies which rely on this information. As well, this Branch publishes a distance directory between all points in the province. Such products are used to attract the industry which could be potentially of value to a wider spectrum of the public.

This data base has been developed to meet a very real requirement within MTC's mandate. It has not received wider uses primarily because there is no mandated legislation to force its use by those application areas which could profit by it. Also, since it does not have a high profile because of the limited resources associated with it, it has perhaps not achieved the extent of use which it is potentially capable of. Most active uses of the system are for areas associated with MTC, such as accident reporting, highway inventory, etc.

Even though the system is well-established and it is unlikely to be modified in format, the system would be greatly enhanced by having co-ordinate values associated with the reference points. This may well make it more attractive to application areas which may want to correlate other inventories with the road networks.

FUTURE NEEDS AND WANTS

Even though the system is currently operational, a number of capabilities would be desirable. It would be desirable to have direct access by computer to the on-line files, but not to have the ability to edit or change existing data on files. By so doing each application area could directly reference the existing LHRS file without an intermediate intervention. This would permit other application areas to provide validation of the keypoint data directly without the need of intermediate steps.

It was suggested that there is a need to expand the offset information to provide two decimal places of precision. At present, data is only kept to the nearest tenth of a kilometre.

There is also a need to reference a number of secondary points which are off the highway system. The system was initially designed to handle only the provincial data highways; however, many application areas would benefit by having access to reference points of the highway system. This would involve some expansion of the existing file capability, but it could be readily handled.

There is clearly a need to be able to provide a better mechanism for correlating data between application areas. There is a potential for this system to be used for interrelating data amongst a variety of application areas. This aspect has not been developed to its full potential; however, it could be with some effort. Some expansion of the interface capabilities that currently exist would be required.

Even though there is little or no use made of maps at this time, it would be desirable to be able to plot the keypoint data and associated data items on planimetric maps. This could only be done if co-ordinate data were maintained for the individual data points.

G.I.S. POTENTIAL

There is clearly a potential to incorporate this type of capability within a generalized geographical information system. Through this system a variety of other application areas can gain access to information from the transportation network by means of the keypoint files. The system provides an inventory of the transportation network, but as well has feature data associated with it which can be of value to other application areas.

Even though there is no direct processing function associated with this file, there would be in the individual application areas. The data from the application area would not work with data found within the keypoint data files of LHRS; a variety of G.I.S. related activities might be meaningful in this context.

DATA SOURCE INFORMATION SHEET

TITLE: Linear Highway Referencing System (LHRS)

SOURCE AGENCY: Ministry of Transportation and Communications

PERSON: Mr. R. Critelli

TITLE: Program Information Planner

ADDRESS: 4th Floor, West Tower
Downsview, Ontario
M3M 1J8

PHONE: (416) 248-3066

DESCRIPTION: LHRS represents a grid network of the entire highway system in Ontario. It is used to reference data such as traffic accidents, traffic volumes, and highway inventory data

FORMAT:

	M	A	MEDIA
MAP			
TABULAR		x	disk
IMAGE			
TEXT			
LIBRARY			

NOTE: N/A

SCALE: N/A

ACCURACY/RESOLUTION: N/A

SIZE/VOLUME: 3,000 rerenced grid intersections 7,000 feature points representing 25 megabytes of data

GROWTH RATE: marginal 25 records/month

DATA ITEMS: LHRS reference number
- section distance
- offset distance to reference data
- description and dates

Examples of feature data includes railway crossings, structures, county, region and district boundaries.

RETRIEVAL KEY(S): LHRS identification number and date

GEOCODE: no co-ordinates or latitude/longitude used

DATE OF CREATION: 1977

FREQUENCY OF UPDATE: monthly

COVERAGE/COMPLETENESS: all highways in Ontario which includes "King's, secondary and tertiary

SOURCE OF INFORMATION: the LHRS was established in-house by the MTC using available data such as maps and survey data

USERS OF INFORMATION:
OPP for traffic accident reporting
MTC sections including the Cartography Section, Traffic Engineering Office and the Regional Offices

VOLUME/FREQUENCY OF USE:
depends on the user's needs, however, use of the LHRS is usually on a daily basis

ACCESS METHOD FOR USER:
- through standard reports generated on a monthly basis
- the Traffic Engineering Office has direct computer access

AVAILABILITY: open

CHARGES: none

HARDWARE AND LOCATION: mainframe computer Downsview Computing Centre

SOFTWARE: PL1; all programs have been developed in-house

NOTES (PROBLEMS, DEPENDENCIES, ETC.)
- to develop links between the user files and the LHRS

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: Linear Highway
Reference System
(LHRS)

Ministry of Transportation
and Communications
Capital Projects Branch

Contact: Mr. R. Critelli
Program
Information
Planner

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS		TABULAR DATA								CARTOGRAPHIC DATA																																													IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
										GENERATION						STORAGE	MANIPULATION / ANALYSIS																												DISPLAY																						
																	GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																		
		COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1	Maintaining LHRS	○	●	●	●	◐		◐	◐																																										☐	☐															

14 MINISTRY OF THE SOLICITOR GENERAL ONTARIO PROVINCIAL POLICE

OVERVIEW

The functions of this Department include the performance of all duties and services in relation to the preservation of peace, prevention of crime, offences against the laws in force in Ontario and the criminal laws in Canada; and the apprehension of criminals and offenders who may be lawfully taken into custody.

ONTARIO PROVINCIAL POLICE

ORGANIZATION AND RESPONSIBILITIES

The function of the Ontario Provincial Police (OPP) is to perform duties and services related to the preservation of peace; prevention of crime and offences against the laws in force in Ontario and the criminal laws in Canada; and apprehension of criminals and offenders. In this capacity they maintain an operational police system which keeps track of information relating to criminal activities. Specific attention is given to criminal code offences as opposed to day-to-day activities such as public assistance and complaints.

There are 15 OPP districts in Ontario with between 5 to 12 detachments in each district, and an average of five patrol zones per detachment. Police dispatching is by patrol zones.

TASKS/SYSTEMS

1. Record Crime and Accident Occurrences

The OPP maintains a variety of crime and accident occurrence and other data within an entity-set data base model. One component of the data model is "address" which is represented in one of four forms. The preferred form is a street address used in urban areas. The next is the legal description, i.e., lot, concession and township, generally used in rural areas. Another form of address used by the OPP is the MTC point code system for recording accident statistics. Finally, addresses relating to police patrol zones are used and recorded by OPP district/detachment/patrol zone.

Some addresses are less specific, particularly outside of the country, e.g., Detroit, Yugoslavia. Often, the type of address used is a function of the population density, e.g., street block within a municipality. Currently, the address is stored as a descriptive alphanumeric string rather than by its co-ordinate position.

Currently, the OPP is considering the use of a geocode based on the postal code extended by four digits. The 4-digit suffix will provide increased precision as to the location of occurrences. However, this is not as effective in rural areas where postal codes cover large geographic areas, and is impractical for use outside of the country. The proposed system is expected to provide on-line address validation within postal code districts as well as encoding of positions from which subsequent searches can be done.

The current system is implemented on a Tandem Computer and utilizes an entity-set data base management system developed in-house.

2. Tracking Criminals

The Ontario Provincial Police are also involved in criminal tracking including the recording of known sites where criminals congregate. Using this data, the Police aim to expedite and improve their capabilities for apprehending criminals.

OBSERVATIONS

The Ontario Provincial Police makes very little use of maps except for visual correlation of position. At this time, considerable thought is being given to the creation of a positional component for the public information system using some form of geocode.

The OPP makes extensive use of symbolic addresses (alphanumeric strings) such as the civic address and postal codes. The proposed geocode based on the postal code has limitations since the finest resolutions could cover an area of several city blocks. In the absence of a parcel base system this approach is a viable alternative.

Several municipal police departments have approached the OPP requesting they establish and manage a service bureau operation which would provide the local police departments with an on-line system capability accessible by terminal in lieu of having their own system. This could also be used to subsequently correlate data between different police departments for conducting criminal investigations.

FUTURE NEEDS AND WANTS

OPP identified a need to relate street addresses to grid locations. This could be used for subsequent point in polygon searches to locate positionally related data items associated with police investigations.

There is also a need to be able to translate place names into geocodes which could then be used for positionally related searches. A parcel-based system with uniform coverage across Ontario would facilitate OPP activities. Detailed data on communities, sites and street addresses would support the criminal tracking task, in particular.

G.I.S. POTENTIAL

There is a potential for the OPP to develop or extend the geocode system to function at the parcel level. This would provide a better integration with existing manual georeferencing capabilities (e.g., maps, street files, telephone directories, etc.) down to street address within municipalities. It would also provide a more accurate positional base for realizing spatial queries.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: ONTARIO PROVINCIAL POLICE

LEGEND:
○ MANUAL PROCESS
◉ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
□ DON'T DO NOW BUT WANT TO

			TABULAR DATA								CARTOGRAPHIC DATA																																												IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIO-GRAPHIC DATA			REFERENCE TO DATA TYPES
											GENERATION						STORAGE	MANIPULATION / ANALYSIS																												DISPLAY																							
																		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Record Crime& Accident		●	●	●		●		●											□																																															
		Occurences																																																																	
	2	Tracking Criminals								□						□					□			□																																											

15 BELL CANADA
OUTSIDE PLANT DIVISION

ORGANIZATION AND RESPONSIBILITIES

The Engineering Division of Bell Canada is responsible for maintaining all relevant diagrams with respect to their physical plant. In this capacity, it maintains engineering records of the plant inventory and its location.

TASKS/SYSTEMS

1. Prepare Construction Diagrams and As-Built Drawings

The Bell Canada plant is represented in a series of schematic diagrams which have grown over a period of 50 to 60 years. There is a current volume of approximately 400,000 drawings, most of which are schematics, with limited or varying information.

Bell Canada has the intent to mechanize the drawing of the various schematics and engineering diagrams with the aim to show more details including curve lines in the future.

In putting in a new plant, the procedure followed includes the following steps:

a) Bell engineers work from plans of subdivision to establish the demand and nature of the service required.

b) The outcome of the planning process is a design which is depicted on construction diagrams.

c) The construction drawings are taken to the field for validation and identification of potential problems. All changes are recorded on these drawings.

d) The plant is installed according to the edited construction drawings. Any further changes are also recorded.

e) "As-built" drawings are prepared after the job is completed.

Information on Bell inventory is maintained in terms of the following entities:

- **Switching Centre** - an area which is population driven, and may change over time.
- **Section** - a number of Switching Centres, an arbitrary division based on needs, population, spatial distribution, etc.
- **District** - a number of sections.

None of these entities are based on political boundaries.

There are no other data processing units within the municipality.

OBSERVATIONS

Bell has not done much in spatial automation, even though this activity is of great importance for maintaining an inventory of its plant. Perhaps this is because of the size and magnitude of the task. It would appear that their primary needs at this time are for an automated engineering drawing capability.

Bell Canada has a very large inventory of diagrams which represents its plant and must be maintained. The process of developing and maintaining the schematics is both time-consuming and cumbersome. At present, these drawings are of varying quality and accuracy. There are no consistent standards regarding scale and presentation, some are hard to read. Many of the sheets have been redrawn to reflect numerous updates over time.

Bell has managed to operate effectively for a long period of time by means of adaptive procedures. By recognizing the limitations of their drawings, they have developed an appropriate set of manual measures and procedures to protect and maintain their plant.

There is no degree of cognizance of the potential for a CAD system to assist in the task of maintaining their drawing inventory. To this end, Bell Canada has studied the problem and is likely to proceed with pilot projects to establish cost-effectiveness of this approach.

In maintaining an inventory of its plant, Bell requires a good reference base. At present, this base is the street network since they must locate most of their plant within the road allowance. In placing and locating their plant, reference is made to street lines. Perhaps a good reference base such as the OBM 1:2 000 would suffice for their needs.

Bell also appears to rely heavily on property data for locating easements and some of the inventory, such as poles. This information is also shown on graphics on which all appropriate attribute data is superimposed.

FUTURE NEEDS AND WANTS

Bell Canada has a need for a comprehensive set of base maps on which to superimpose plant data. These maps should show the street right of way, curbs and the parcel fabric with ties to the "iron bars". It would be desirable to have the base map inventory in digital format for Bell to use in documenting all of their plant. In this way, all updates could be entered on-line to maintain a current inventory.

There is a requirement for a continuous property record on plats (continuous data base) so that queries can cross the whole data base. This is necessary since changes made to one part of the Bell system can have substantial consequences on other parts of the network.

It is necessary to show facilities to scale, specifically including manholes and concrete conduits. Even though buried cable is now shown schematically, it is desirable to locate this with respect to street lines. All facilities should be shown with respect to each other and with respect to curbs, sidewalks, lot lines, edge of pavement, street lines, and so forth.

G.I.S. POTENTIAL

There is some G.I.S. potential within the Bell operating environment. Specifically, a G.I.S. system could be used for potential routing and site selection for plants. By means of districting, Bell could benefit most by having access to other data sources such as parcel maps, demographic data, other services, etc. within a shared data base environment. Bell would also benefit from automated query, composition and presentation tools.

DATA SOURCE INFORMATION SHEET

TITLE: BELL CANADA SCHEMATIC DIAGRAMS

SOURCE AGENCY: Bell Canada
PERSON: Aleks Kleniewski
TITLE: Section Manager
ADDRESS: Plant Location & Records
Mechanization
393 University Avenue
Toronto, Ontario
PHONE: (599) 2464 (416)

DESCRIPTION:

Records mechanization

FORMAT:

	M	A	MEDIA
MAP	x		paper
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: schematic

ACCURACY/RESOLUTION:

SIZE/VOLUME: 400,000 plans

GROWTH RATE: Varies according to schematic

DATA ITEMS: Rural routes, overground cable locations, underground cable, detailed conduits, CATV cables, and so forth

RETRIEVAL KEY(S): Plan number by geographical area

GEOCODE:

DATE OF CREATION:

FREQUENCY OF UPDATE: 24-36 updates per schematic each year

COVERAGE/COMPLETENESS: Province - wide

SOURCE OF INFORMATION: In-house

USERS OF INFORMATION: In-house

VOLUME/FREQUENCY OF USE: Daily

ACCESS METHOD FOR USER: Internal over-the-counter

AVAILABILITY: on demand

CHARGES: Nil

HARDWARE AND LOCATION:

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.) None

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: BELL CANADA

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA						
									GENERATION						STORAGE
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Prepare Construction	◐	◐	◐	◐	◐	◐	◐	◐	◐			◐			
Drawings & As-built															
Drawings															

AGENCY FUNCTIONS	CARTOGRAPHIC DATA													
	MANIPULATION / ANALYSIS													
	GEOMETRIC ANALYSIS													
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Prepare Construction	☐			◐		◐	◐			◐	◐	◐	◐	
Drawings & As-built														
Drawings														

AGENCY FUNCTIONS	CARTOGRAPHIC DATA														
	MANIPULATION / ANALYSIS														
	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Prepare Construction	☐												◐	◐
Drawings & As-built														
Drawings														

AGENCY FUNCTIONS	CARTOGRAPHIC DATA									
	DISPLAY									
	COMPOSITION					PRESENTATION				
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Prepare Construction	◐	◐	◐		◐		◐	◐		◐
Drawings & As-built										
Drawings										

AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Prepare Construction													
Drawings & As-built													
Drawings													

16 ONTARIO HYDRO

16.1 OVERVIEW

Ontario Hydro is a publicly owned financially self-supporting utility company. It supplies electric power, in partnership with associated municipal electrical utilities, to the Province of Ontario. The total staff complement for Hydro is 28,000.

Ontario Hydro is a large user of land-related data, particularly for siting transmission line routes and power stations. Much of the data Ontario Hydro requires is obtained from the provincial ministries or collected by Hydro field crews.

An automated route and site selection system (CARSS) has been implemented to aid in siting Hydro facilities. Since much of the data used in CARSS is land-related, this Section of the organization was interviewed for the User Needs Study. Two planning sections, namely, surplus land and nuclear facility planning, were also interviewed to determine land-related data needs for the planning functions at Ontario Hydro.

16.2 DESIGN AND DEVELOPMENT DIVISION
ENVIRONMENTAL STUDIES AND ASSESSMENTS DEPARTMENT
ENVIRONMENTAL PLANNING AND ASSESSMENTS SECTION

ORGANIZATION AND RESPONSIBILITIES

The responsibility of this Section includes the provision of environmental input to the site selection, design and construction of generating stations and related facilities.

Particularly, the Section performs four tasks:

1. conducts concept assessment studies to examine particular issues of conceptual designs and alternatives of relevance to Ontario Hydro, such as acid rain, radioactive waste management and feasibility studies for various generation alternatives;
2. selects sites for nuclear, fossil and hydro-electric generating stations;
3. conducts project assessment studies, which examine environmental impact at specific sites; and
4. provides advice to Ontario Hydro on environmental matters, specifically with regard to legislation.

A staff of fifteen complete these tasks in order to fulfill the Section's responsibilities.

TASKS/SYSTEMS

1. Conduct Concept Assessment Study

In choosing particular sites for a Hydro station, a number of steps are involved. Initially, this Section conducts concept assessment or feasibility studies in order to ascertain the broad based environmental impact of a proposed project. At this stage, the potential environmental impact is usually examined from a general rather than site specific point of view to identify major environmental problems early in the project.

An example of a Concept Assessment Study is the current study on nuclear fuel waste management. In this case, the Section is examining the generic environment of the Canadian Shield in Ontario for possible future nuclear waste projects.

2. Identify Potential Hydro Sites

The second stage in conducting environmental assessments for Hydro projects deals with more region-specific research. At this point, a region is identified and studied as a whole. There are a number of criteria used to locate potential sites, namely, air parameters, water body attributes, land characteristics, such as sensitive natural areas, and so forth. Possible site locations are narrowed down to candidate zones. These candidate zones are then looked at in greater detail with a larger number of factors and criteria.

Potential sites are identified after more detailed research and are recommended as potential Hydro station sites. Much of this data such as soil types, water body attributes, land use, zoning and sensitive biological areas are superimposed on the NTS series 1:250 000 scale maps. Data is collected from existing publications, field survey, aerial photographs and satellite imagery. Maps at the scale of 1:250 000 are used for regional studies. Maps at the scale of 1:50 000 or larger are utilized for more site specific studies.

3. Conduct Project Assessment Studies

The final stage in conducting an environmental assessment for projects is the site specific research. Project assessment studies involve very detailed site mapping, aerial photography and field survey. Not only is the site in question examined in detail but also a 50 km buffer zone around the site is analysed. Suitability for the project is determined from an analysis of site specific factors. For example, the Section has input into the placement of roads in the case of sensitive biological areas. The same type of data, as were collected in the broader studies, is required for the Project Assessment Study, e.g., soil type, hydrologic data, land use, etc.; however, at this stage it is required in greater detail and displayed on maps ranging in scale from 1:10 000 to 1:50 000.

SYSTEM

Currently, there is limited use of computer systems in completing the planning function. However, an IBM personal computer is being used for some modelling capabilities, such as analysing data for various parameters for input to an environmental impact model, indexing existing publications and maps and possible storage of a number of inventories such as soil types, land use, zoning, etc. The Section has also made use of the Ontario Hydro CARSS (Computer Automated Route and Site Selection) system which was developed by the Route and Site Selection Division for use in transmission routing studies. Specifically, CARSS was used to identify and plot soil textures across the province. A soils map generated through the use of CARSS is contained in the Appendix.

An indexing system for the 5,000 to 10,000 documents stored in the department and in various locations within and outside the Corporation is currently in place on the IBM mainframe computer. This is used for accessing all relevant information or sources of information that may be applied to this planning function. There is also some modelling capability on the mainframe computer, in particular atmospheric and aquatic dispersion models.

OBSERVATIONS

The Environmental Planning and Assessment Section is involved to a great extent with other departments within Ontario Hydro and various government agencies.

Given the high profile of a number of the Hydro projects such as those making nuclear power and the requirement to fulfill provincial environmental and other regulatory needs, a large amount of data must be collected and research carried out to ensure that the impact on the environment will be minimal. In this function, the Section generates a large number of maps to be included in their reports.

This Section has experienced some problems in correlating data shown on maps of various scales. The use of FRI maps, for example, is limited as a result of the 1:5 840 scale being difficult to correlate with the existing OLI and CLI scales of 1:250 000 or 1:50 000.

Currently, the Section receives some data in digital format from the Ministry of the Environment, such as water quality site data and from the Ministry of Natural Resources, such as geological lakes and soils data. The Section would like ready access through the use of a terminal to such existing data, particularly, if it were available related to a common base.

FUTURE NEEDS AND WANTS

As mentioned earlier, the Section requires ready access to specific site-related information; for example, the availability of Statistics Canada information based on smaller administrative units such as enumeration areas as well as better coverage of data for the entire province.

The Section would also like to automate a number of other modelling functions. A major requirement of this Section is the ability to store and retrieve data in a standardized format so that the different disciplines involved in project planning at Hydro can access and use this data.

G.I.S. POTENTIAL

This Section would benefit from a number of G.I.S. capabilities. In particular, the planning function requires a number of spatial and attribute query capabilities with regard to suitable site selection. These would include polygon overlay for site selection, windowing for identifying Hydro regions and specific sites, buffering for conducting project assessment studies in determining surrounding land use, and point in polygon searches in order to determine the number of constraints within a given area, area calculations and theme manipulation.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: ONTARIO HYDRO
ENVIRONMENTAL
PLANNING

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

AGENCY FUNCTIONS	TABULAR DATA								CARTOGRAPHIC DATA						
									GENERATION						STORAGE
	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	CODE	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Site Selection	○				●	●		◐							◐
2 Conduct Concept Assessment Studies	○				●	●		◐							◐
3 Conduct Project Assessment Studies	○	●	◐	◐	◐	◐		◐							◐
4 Provide Advice	○	◐	◐	◐											

AGENCY FUNCTIONS	CARTOGRAPHIC DATA																
	MANIPULATION / ANALYSIS																
	GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
1 Site Selection	◐			◐	◐		◐				◐	◐					
2 Conduct Concept Assessment Studies	◐				◐		◐				◐						
3 Conduct Project Assessment Studies						◐					◐						
4 Provide Advice																	

AGENCY FUNCTIONS	CARTOGRAPHIC DATA										
	MANIPULATION / ANALYSIS										
	DIGITAL TERRAIN MODELLING									QUERY	
	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Site Selection							◐			◐	◐
2 Conduct Concept Assessment Studies							◐			◐	◐
3 Conduct Project Assessment Studies							◐			◐	◐
4 Provide Advice											

AGENCY FUNCTIONS	CARTOGRAPHIC DATA									
	DISPLAY									
	COMPOSITION					PRESENTATION				
	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Site Selection	◐			◐	◐	◐	◐			◐
2 Conduct Concept Assessment Studies	◐			◐	◐	◐	◐			◐
3 Conduct Project Assessment Studies	◐			◐	◐	◐	◐			◐
4 Provide Advice										

AGENCY FUNCTIONS	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIO-GRAPHIC DATA			REFERENCE TO DATA TYPES
	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Site Selection										◐	○	○	
2 Conduct Concept Assessment Studies										◐	○	○	
3 Conduct Project Assessment Studies										◐	○	○	
4 Provide Advice				◐	◐	◐	◐						

16.3 REAL ESTATE SERVICES DIVISION
REAL ESTATE MANAGEMENT PROGRAMS DEPARTMENT
PLANNING AND DEVELOPMENT PROGRAMS SECTION

ORGANIZATION AND RESPONSIBILITIES

The primary land-related functions of this Section are secondary use and surplus real estate rights studies. Secondary use studies involve analysis of Hydro operating lands regarding potential land use secondary in importance to electricity generation and transmission. Surplus real estate rights studies involve analysis of Hydro surplus properties.

Other land-related functions of the Section include reviewing Official Plans, zoning bylaws and subdivision plans, preparing environmental assessments for secondary use of Hydro lands and obtaining municipal approvals for surplus properties.

These responsibilities are carried out by the Section's staff of four planners.

TASKS/SYSTEMS

1. Preparing Secondary Use Studies

Secondary use studies are carried out for each of the Ontario Hydro regions. These studies deal with identifying those secondary uses on Hydro's operating lands for the highest potential revenue. The major type of Hydro's operating lands considered for this program are power transmission corridors. This represents a large source of rental income to Hydro, e.g., in 1982 approximately $4 million was received from rental income. One example where Hydro has rented a section of a transmission corridor for vehicle parking is the Yonge-Finch subway station in Toronto. Other examples are municipal allotment gardens, pipelines and private commercial enterprises.

The Section points out to the various region offices those portions of the power corridors which show the highest potential for rental income. This analysis is carried out by investigating the current zoning bylaws in the areas and adjacent land use of the property, and using other sources of documentation that may help them in arriving at a recommendation. These secondary use studies also involve site visits by the Section's personnel.

2. Analysing Surplus Land Development Potential

Ontario Hydro owns approximately 25,000 acres of land which it has categorized as surplus or potentially surplus land. There are approximately 400 parcels in the inventory, ranging in size from 1 to 400 acres. This Section looks at the development potential of any surplus parcels of land, suggests various development possibilities and assists the regional offices in marketing the parcels as deemed necessary.

Income earned by Ontario Hydro through the sale of surplus land was approximately $5 million in 1982 and an expected $6 million in 1983.

In assessing the development potential of these surplus parcels of land, this Section collects a variety of information which includes soil, demographic, market potential, social/cultural data, and so forth. All of this data is utilized to help formulate an idea for the suitability of the land for development purposes.

Maps are used during this process and the scales depend on the size of the parcel in question. To investigate the parcels at a regional level, the Section utilizes NTS maps at a scale of 1:25 000 and 1:50 000. The data that has been collected is then superimposed on these maps using polygon overlays to determine suitable development sites.

The Planning and Development Program Section uses the Computer Assisted Route and Site Selection program (CARSS) developed at Ontario Hydro to store and retrieve parcel data on its surplus land. The CARSS is based on the UTM grid system, and allows the user to store, retrieve and plot data assigned to cells. The cell sizes are user-defined, and may range in size from 100 sq. metres to 2,000 sq. metres.

The Planning and Development Programs Section has assigned each surplus parcel to one individual 1 sq. km grid cell. Each grid cell containing a parcel of land has a data file containing up to 25 items of development suitability data. These items include zoning, vegetation type, soil conditions and frontage as well as the parcel location identifier (specifically, the township, lot and concession). A complete list of the items is contained in Figure 16.3-A. Development potential models have been created for 12 different land uses so that the potential of any surplus properties can be determined.

The grid cells are the basis for location in the CARSS system and are referenced by UTM co-ordinates. The task of associating this data to the grid cells has been completed for the central and eastern Hydro regions to date for those properties greater than 25 acres.

The system is queried for suitable land parcels in regard to specific potential development such as commercial, recreational or residential uses.

The Section also utilizes a manual inventory system called the Property Information Record System. This manual file contains lease and licence information on the parcels of land owned by Ontario Hydro and is accessed by lot and concession number.

OBSERVATIONS

Being involved primarily in planning, this Section relies on a considerable amount of data from other organizations. This Section also deals with other organizations such as the Ontario Waste Management Corporation and the engineering firm Proctor and Redfern which utilizes information collected by this Section for their own studies.

By using the CARSS system, only the approximate location of a parcel of land is known, i.e., that it resides in a particular 1 sq. km grid. If several parcels of land are close together, they are each assigned to a different 1 sq. km grid cell. It is not important that a property's map location be exact, since the location information is one of the pieces of information collected on each property. Additionally, the entire computer system files are backed up by a manual filing system located at the Section's office.

The main purpose of utilizing CARSS is for information storage. The fact that a map can be produced is considered a bonus.

FUTURE NEEDS AND WANTS

A desire, but not a priority, of this Section is to have the ability to display a particular parcel and the parcel attributes on a terminal screen. This would require the use of a digital map which currently exists. This Section would also like to have ready access to any additional information that may be required to carry out its development studies, such as zoning, soils, demographic, vegetation type information, preferably on an automated on-line basis.

G.I.S. POTENTIAL

This Section would benefit from the integration of data sources, including spatial and attribute data and the ability to display parcel attribute data along with a digital parcel map on a terminal screen. Some of the capabilities required by this Section that can be realized through the use of a G.I.S. include polygon overlay capabilities for identifying certain suitable lands for development, contiguity analysis to ascertain adjacent land uses for planning, and the ability to perform scale changes in order to obtain large scale maps for individual parcels and small scale maps for Hydro regions.

Figure 16.3-A

1. Property Name and Number
2. Location (Lot, Concession, Township, Municipality)
3. Surplus Status
4. Future Systems Plans Affecting Property
5. Area (in hectares)
6. Grant in Lieu of Taxes
7. Approximate Value
8. Land Use/Policy
9. Distance to Urban Services
10. Shape of Property
11. Summary of Development Constraints/Development Suitability
12. Physical Site Characteristics
13. Topography
14. Drainage
15. Water Features
16. Vegetation Type
17. Vegetation Coverage
18. Municipal Services
19. Transportation Characteristics

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: ONTARIO HYDRO
Real Estate
Management
Programs
Planning Studies

Surplus Land
and
Secondary Use Studies

LEGEND:
○ MANUAL PROCESS
◉ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

			TABULAR DATA								CARTOGRAPHIC DATA						
											GENERATION						STORAGE
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	CODE	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
AGENCY FUNCTIONS	1	Studies of secondary	○			◉	◉			◉							
		use															
	2	Studies on surplus	○	◉	◉	◉	◉			◉							
		land development															
		potential															

			CARTOGRAPHIC DATA																
			MANIPULATION / ANALYSIS																
			GEOMETRIC ANALYSIS														NETWORK ANALYSIS		
			POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING
AGENCY FUNCTIONS	1	Studies of secondary	◉						◉		◉					◉			
		use																	
	2	Studies on surplus	◉			◉			◉		◉					◉			
		land development																	
		potential																	

			CARTOGRAPHIC DATA																				
			MANIPULATION / ANALYSIS											DISPLAY									
			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION				
			SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
AGENCY FUNCTIONS	1	Studies of secondary										◉	◉	◉		◉	◉	◉	◉				◉
		use																					
	2	Studies on surplus										◉	◉	◉		◉	◉	◉	◉				◉
		land development																					
		potential																					

			IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
			COLLECTION	STORAGE	RETR/EVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETR/EVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETR/EVAL	
AGENCY FUNCTIONS	1	Studies of secondary													
		use													
	2	Studies on surplus													
		land development													
		potential													

16.4 ROUTE AND SITE SELECTION DIVISION
LAND USE AND ENVIRONMENTAL PLANNING DEPARTMENT
COMPUTER ASSISTED ROUTE AND SITE SELECTION SYSTEM (CARSS)

ORGANIZATION AND RESPONSIBILITIES

The primary mandate of the Land Use and Environmental Planning Section is the development and maintenance of the computer system CARSS. A secondary mandate involves the development of storage, management and retrieval systems for data necessary for Hydro transmission projects. The CARSS system is used to aid the Land Use and Environmental Planning Department in determining and assessing environmental perimeters with respect to the provision of transmission facilities. A staff of eight are involved with the CARSS system, and they operate on a project basis.

TASKS/SYSTEMS

1. Perform Route and Site Selection using CARSS

A project co-ordinator for an Ontario Hydro Transmission Line project will make the decision to use the CARSS system. It is the responsibility of this project co-ordinator to collect and have data in digital format. The input standards must be approved by the staff involved with the CARSS system. Input follows a number of procedures that have been documented by CARSS. The CARSS staff monitor and ensure that the data is in a format compatible with CARSS processing.

Data is derived from a number of sources, including Ministry of Natural Resources, the Fisheries, Wildlife and Forestry Divisions, the Ministry of the Environment, aerial photography and field surveys. The data is input at a variety of scales, accuracies and map projections. The major vehicle for input is digitizing tables, although some data can be keyed in via alphanumeric terminals. Data can be input in a variety of forms, namely, point, line, polygon and grid cell. CARSS utilizes the transformation component of the MANOR program to transform latitude/longitude and MTM data to UTM co-ordinates which is the standard location format for data used in the CARSS system. When the map is placed on the digitizing table, four points of the map are digitized and the respective UTM, MTM co-ordinates or latitude and longitude entered. This ties the map area to the UTM system.

Before the project data can be manipulated by the CARSS system it must be converted to cell data. The cells are of a variety of sizes ranging from 2,000 metre squares to 200 metre squares and in some cases 100 metre squares, using software that was developed by the Computer Services Division of Ontario Hydro in conjunction with this Section. The data entered for the project is used in conjunction with data from other sources including Statistics Canada information, census information, and other data. There are some problems in using data from other sources, in that much of the data must be converted to the CARSS format.

The project co-ordinator selects the modelling capability that he wishes to employ for his project. Every model is unique for each specific project. For example, a user may specify certain conditions, in that when these conditions are met the areas are identified and plotted. Models can range in complexity and vary from project to project. Specific models will manipulate the stored data in such a way as to be relevant to the project. The information from the modelling process is stored in record files to be accessed at a later time for report generation or plotting. During report generation or plotting, the user can specify a number of conditions (Boolean logic) in order to have a report or plot generated.

SYSTEMS

The CARSS system does not use a data base but rather the information is stored in sequential record files. A data base has been developed and is currently being tested. The information can be accessed by attribute name and location window. The common link between the record files is the attribute name and the UTM grid. In the record files there are a number of fields, depending on the type of data, attribute name, attribute value and location (UTM co-ordinates).

The input of data is performed on a PDP11/70 minicomputer. Four digitizing tables are used; two Calcomp 900, one Calcomp 800 and one Calcomp 600. Two disc drives are used to store the project information. Due to the large amount of data that is maintained, archived projects are stored on magnetic tape. An electro-static Versatec 36 inch plotter is used to produce the output maps.

All CARSS software was developed in-house and is written in Fortran. The application models are written in COBOL. The data manipulation is performed on a Univac 1108. All input (digitized data) and output of project data such as maps is completed on the PDP11/70. Most modelling manipulations are performed on the Univac 1108. The data must be transferred between these two compatible systems by tape. Univac and IBM data are not generally transferred from machine to machine. For both computers, data is entered via keyboard or tape transfer. There are seven terminals in the Section that are linked to the PDP11/70 and three of these terminals are linked to Hydro's IBM and Univac.

OBSERVATIONS

At any one time there are at least two major projects under way in this Section. These projects can span several years. There are also a number of smaller projects (four to five per year) that are conducted with respect to transmission routes and sites, such as a microwave station project. As well, there are four to five projects per year related to various other users within Ontario Hydro. This could include the development suitability of surplus Hydro lands. The number of cells usually used for each project are 80,000 to 120,000, and the number of cells can be increased and decreased on demand even within specific projects. The reasons for this upper limit is that computer cost beyond the 120,000 cells becomes exponentially more expensive. Whether it is prohibitive or not depends on the project budget.

All of the data for manipulation is stored on a project basis; however, some projects have such a large scope that information can be used for smaller projects in the same area. However, CARSS is considered a data manipulation tool and not an inventory of resources. Project data of similar accuracies and cell size can be merged to create new project files. If this mandate were changed, much potential could be realized.

The Section has attempted to obtain digital data that is available from a number of sources, and to incorporate this data into the CARSS system. Problems were encountered in transferring this data onto the IBM 2000 or Univac systems and in trying to retrieve and manipulate some of this data. Data compatibility is the major problem overall.

FUTURE NEEDS AND WANTS

The Section is working towards developing a data base system. A data base system would increase the linkages between all data and enhance the management of the data.

The Section is interested in exchanging digital files with a number of data sources. It is imperative that this digital information be compatible to the CARSS system.

The modelling capabilities used by this Section could be provided in a more user-friendly format. The Section would also like to perform a number of other modelling capabilities including digital elevation modelling, slope aspect, cross-sectioning, 3-D modelling and visual analysis.

The staff would like to use a digital OBM as a base for the data required in the projects.

The Section would like ready access to a number of data sources. Currently, research is being conducted in using Landsat data in digital format. Other information that is required by this Section would be access to census data, cadastral information, forestry information, geological information, soils information, etc. Any information that can be obtained and used in digital format would be of benefit in carrying out this Section's mandate. By using available digital data, the Section could avoid duplication of effort by having to redigitize information.

G.I.S. POTENTIAL

The Section would benefit from a G.I.S. system by having the ability to use as a base Ontario Basic Mapping onto which they could superimpose project relevant data. With comprehensive OBM coverage and a mandate to maintain a complete data inventory, a variety of G.I.S. tools would be broadly used. The Section would make use of such capabilities as digital terrain modelling, specifically spatial interpolation, contouring, slope/aspect, cross-sectioning and 3-D viewing in offering modelling capabilities for the Transmission Line Planning Sections. The major benefit to this Section of a G.I.S system is the capability to link to a number of other compatible data bases and use the information in these data bases for the projects undertaken.

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: CARSS

COMPUTER AIDED ROUTE
AND SITE SELECTION

HYDRO
LAND USE AND ENVIRONMENTAL
PLANNING DEPARTMENT

LEGEND:
- ○ MANUAL PROCESS
- ● NOW DONE MANUALLY WANT TO AUTOMATE
- ● AUTOMATED PROCESS
- ☐ DON'T DO NOW BUT WANT TO

	TABULAR DATA							
AGENCY FUNCTIONS	COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION
1 Route and Site Selection		●		●	●	●	●	●

	CARTOGRAPHIC DATA						
	GENERATION						STORAGE
AGENCY FUNCTIONS	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT
1 Route and Site Selection		●		●	●		●

	CARTOGRAPHIC DATA													
	MANIPULATION / ANALYSIS													
	GEOMETRIC ANALYSIS													
AGENCY FUNCTIONS	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS
1 Route and Site Selection	●	●		●		☐	●		☐	●	●	☐	☐	☐

	CARTOGRAPHIC DATA													
	MANIPULATION / ANALYSIS													
	NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY	
AGENCY FUNCTIONS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3-D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY
1 Route and Site Selection		☐	☐	☐	☐	☐		☐	☐		☐	☐	●	●

	CARTOGRAPHIC DATA									
	DISPLAY									
	COMPOSITION					PRESENTATION				
AGENCY FUNCTIONS	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT
1 Route and Site Selection	●		●	●	☐	●	●	●	☐	●

	IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
AGENCY FUNCTIONS	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
1 Route and Site Selection	☐	☐	☐					☐	☐	☐	☐	☐	

17 UNION GAS
CHATHAM, ONTARIO

ORGANIZATION AND RESPONSIBILITIES

Union Gas is the utility company providing natural gas to the Municipality of Cambridge. The Company has a franchise area covering approximately 32,000 sq. km with over 450,000 customers. The distribution system involves over 16,000 km of pipeline.

The head office for Union Gas is in Chatham, Ontario, which co-ordinates seven divisions. In 1977, Union Gas purchased a turnkey system for automated mapping. The primary purpose of the automated mapping system was to develop a digital data base for its own internal mapping purposes. Much of the rationale for the system was based on the need for metric conversion.

TASKS/SYSTEMS

1. Produce Base Maps

Union Gas had established its own base map on a rectangular grid of 12,070 metres horizontal by 10,058 metres with an origin at 81° longitude, 43° latitude. Each grid cell provides coverage of a 1:12 000 scale map (related to 1 inch = 1,000 feet). The basic map is subdivided into four standard maps as follows:

1:12 000	(1 inch = 1,000 feet
1: 4 800	1 inch = 400 feet
1: 2 400	1 inch = 200 feet
1: 1 200	1 inch = 100 feet)

These maps are based on the 6° UTM and are usually derived from a variety of data sources, principally the NTS 1:50 000 series. In 1971, both the 1:2 400 and the 1:1 200 map series were discontinued because of costs. Furthermore, with the need for metrication, the scales were adjusted to 1:10 000, 1:5 000 and 1:2 000.

Because of the costs involved, Union Gas digitized existing photogrammetric maps for urban areas and Company maps for rural areas. The two standard maps produced are the 1:1 000 and the 1:10 000. There are a total of 4,420 1:1 000 maps, 403 1:5 00 maps and 240 1:10 000 maps to cover the service area of Union Gas.

The base maps are produced by digitizing existing photogrammetric maps and infilling with data from plans of subdivision and other sources. The procedure followed involves:

1. obtaining all reference maps for a given grid cell
2. obtaining survey monument data
3. establishing a frame of reference and scaling as necessary to input data from graphics

4. digitizing graphics, viewing on screen and editing
5. making check plots
6. visually validating with source documents
7. checking map sheet boundaries for consistencies, and editing, and
8. preparing final plot and filing

Since the placement of all text and facilities in the base maps can lead to a cluttered drawing, the street lines are dispersed by four metres to produce false street lines. This provides greater clarity. Such information is indicated by the appropriate notes on the map.

The maps, at scales of 1:1 000 and 1:20 000, are complete for one division and represent about 12% of the total requirement.

COMPUTER MAPPING SYSTEM

Union Gas purchased a CALMA graphics system in 1977, which consists of:

Data General minicomputer with 128 kbyte memory
2 80 mbyte disc drives
1 16000 bpi tape unit
3 digitizing stations (36"x48")
2 digitizing stations (11"x11")
1 Calcomp 748 Statbed plotter

This system has been used for digitizing and editing existing map graphics and plans of subdivision.

2. Encoding of Physical Plant

The information about physical plant is found in a large number of documents and hence would be time-consuming to enter directly into the system. As well, basic inconsistencies cannot be readily resolved.

The procedure followed to enter plant data is to collect all plant data and draw it on to the base map. This is then digitized and checked as it is entered into the data base. During this process, it is also visually checked against existing drawings.

OBSERVATIONS

The current automated mapping system which began in 1977, has been used to provide mapping to some municipalities such as Chatham.

At present, no use is made of OBM maps, although if 1:2 000 were available, these could be blown up to 1:1 000 for use by Union Gas. This would be drawn directly on readily available base maps, rather than developing their own base maps.

The existing data base is very much a graphics data base with each map sheet or facet being independent of its neighbours. No attempt is made to provide a continuous data base at this time. There is clearly recognition of current limitations, a situation which has perhaps motivated a Digital Faciltiies Information System Study. The current graphics system undergoes limited maintenance, as its future is uncertain.

Since Union Gas is an amalgamation of a number of separate utilities, it is faced with a system which involves a number of different base maps, e.g., 1" = 1,000' except for Chatham, 1" = 400' for urban areas, but 1" = 100' for Windsor and Hamilton. The quality and currency of these maps vary. Also, there is no continuity between map sheets, and as such, disparities occur with the graphics data base.

Union Gas has extensive experience in creating a digital map base. From their experience they have uncovered many unanticipated problems. It is interesting to note that they have relegated their digital mapping system to a low priority. Instead, they have moved to a digital facilities information system concept as a means of building a comprehensive data base for their physical plant.

OBM 1:2 000 map would be a useful base for superimposing Union Gas facilities. Even though OBMs do not provide the accuracy identified, they may be suitable for their needs, particularly because the primary needs are for "representative" mapping. A relative accuracy of one foot (with respect to curbs, street hardware, etc.) could be achieved, providing Union Gas with the necessary positional component of their physical plant.

By having a facilities data base, there is a potential for running a number of analysis and optimization programs which relate to the operational base. As well, limited access to the Union Gas facilities data base would be useful to the municipalities for planning and inventory purposes.

FUTURE NEEDS AND WANTS

Union Gas has a variety of needs in carrying out its mandate. First among these is the need for representative mapping, preferably at scales of 1: 1 000 for detailed maps for all urban areas and 1:10 000 maps for all rural areas. These maps should form a continuous data base from which any section can be windowed out and plotted at any desirable scale. It is expected that the 1:1 000 map could be used to derive the 1:2 000 map.

It is necessary to show physical plant on the map base. In order to do this, false property lines are imposed. For purposes of clarity, however, the actual information should be positionally accurate to one foot. This is not an absolute requirement since locates will always be done (as per the Energy Act).

Union Gas would like to tie into a data network which could provide a "one call locate" system capability.

There is a need for a continuous data base which provides a full inventory of their physical plant. As well, it is necessary to have a good access to this data in a variety of formats, including remote on-line access for terminals, hard copy in the form of paper working drawings and microfiche.

There is also a need for a common facilities data base which would integrate all of Union Gas' facilities information. This system would provide access to a number of subsystems, including:

a) mapping system
b) distribution network analysis
c) corrosion control system
d) distribution regulator stations inventory
e) base history system
f) pipe ledger system
g) mechanized value system
h) market area analysis

G.I.S. POTENTIAL

There is great potential for a G.I.S. system within any utility and Union Gas in particular. This would clearly provide better access to information about the current plant and would be useful to both Union Gas and the Municipality for planning and engineering purposes. Specifically, the utilities plant could be located with respect to the street network data and to other utilities data. There is some potential for network analysis in terms of network flows and management.

Perhaps the greatest benefit to be derived from a digital capacity for this utility would be on-line access and display to plant data for purposes of maintenance and update, specifically, using the street network files.

DATA SOURCE INFORMATION SHEET

TITLE:

SOURCE AGENCY: Union Gas Ltd.
PERSON:
TITLE:
ADDRESS:

PHONE:

DESCRIPTION: Plant Facilities Data Base
(Pipelines and Associated Data)

FORMAT:

	M	A	MEDIA
MAP	x	x	vellum
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE:

ACCURACY/RESOLUTION: ± 1%

SIZE/VOLUME:

1:1000	639
1:5000	86
1:10,000	74

GROWTH RATE: update only

DATA ITEMS: plant data
- pipelines
  - text
- chainages
- valves
- dressings
- regulator stations
- reducers
- caps
- insulation points

RETRIEVAL KEY(S):

GEOCODE:

DATE OF CREATION: 1979-83

FREQUENCY OF UPDATE: As Required

COVERAGE/COMPLETENESS: franchise areas of Sarnia & Chatham

SOURCE OF INFORMATION: design drawings

USERS OF INFORMATION: field crews
engineering
sales group

VOLUME/FREQUENCY OF USE: As Required

ACCESS METHOD FOR USER: map sheet
microfiche

AVAILABILITY:

CHARGES:

HARDWARE AND LOCATION:

SOFTWARE:

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

DATA SOURCE INFORMATION SHEET

TITLE:

SOURCE AGENCY: Union Gas Ltd.

PERSON:

TITLE:

ADDRESS:

PHONE:

DESCRIPTION: Base Maps (Geography)

FORMAT:

	M	A	MEDIA
MAP	x	x	vellum
TABULAR			
IMAGE			
TEXT			
LIBRARY			

NOTE:

SCALE: 1:1 000 1:5000 1:10 000

ACCURACY/RESOLUTION: ± 1%

SIZE/VOLUME:

1:1000 -	639
1:5000 -	86
1:10000	74

GROWTH RATE: 5%/yr

DATA ITEMS:
1. streets
2. lots
   railways
   rivers
   text
   property lines

RETRIEVAL KEY(S):

GEOCODE: map sheet

DATE OF CREATION: 1977 - 1983

FREQUENCY OF UPDATE: as required

COVERAGE/COMPLETENESS: Chatham, Sarnia and small towns
partially Hamilton,Brantford&Windsor
- expected to cover user area

SOURCE OF INFORMATION:
NTS 1:25 000
1"-40' through 1"-200' planimetric
Registered Plans

USERS OF INFORMATION: field crews
engineering
sales group

VOLUME/FREQUENCY OF USE: as required

ACCESS METHOD FOR USER: map sheet
microfiche

AVAILABILITY: limited

CHARGES:

HARDWARE AND LOCATION: CALMA system

SOFTWARE: Calma/Enhanced in-house

NOTES (PROBLEMS, DEPENDENCIES, ETC.)

only part of base map

GEOGRAPHIC DATA MANAGEMENT PROCEDURES

TITLE: UNION GAS

LEGEND:
○ MANUAL PROCESS
◐ NOW DONE MANUALLY WANT TO AUTOMATE
● AUTOMATED PROCESS
☐ DON'T DO NOW BUT WANT TO

			TABULAR DATA								CARTOGRAPHIC DATA																																														IMAGE DATA			TEXT DATA				BUSINESS GRAPHICS DATA		BIBLIOGRAPHIC DATA			REFERENCE TO DATA TYPES
											GENERATION						STORAGE	MANIPULATION / ANALYSIS																												DISPLAY																						
																		GEOMETRIC ANALYSIS														NETWORK ANALYSIS			DIGITAL TERRAIN MODELLING									QUERY		COMPOSITION					PRESENTATION																	
			COMPILATION	DATA/ENTRY	UPDATE	STORAGE/MANAGEMENT	DATA MANIPULATION	STATISTICAL ANALYSIS	ON-LINE QUERY	REPORT GENERATION	COMPILATION	DIGITIZING/EDIT	COGO	UPDATE	MAP JOIN / EDGE MATCH	ADDRESS GEOCODING	STORAGE/MANAGEMENT	POLYGON OVERLAY	VECTOR/CELL CONVERSION	POLYGON DISSOLVE	POINT IN POLYGON	TRANSFORMATIONS	BUFFERING/CORRIDORING	WINDOWING	COORDINATE FILTERING	PROXIMAL ANALYSIS	LINE LENGTH CALCULATION	AREA/PERIMETER CALCULATION	AGGREGATION/DISTRICTING	DISTANCE ACCUMULATION	CONTIGUITY ANALYSIS	OPTIMAL PATH SELECTION	FLOW SIMULATION	TIME/DISTANCE DISTRICTING	SPATIAL INTERPOLATION	CONTOURING	SLOPE / ASPECT	SUN INTENSITY	VIEWSHED	WATERSHED ANALYSIS	VOLUME CALCULATION	CROSS SECTIONING	3 D VIEWING	SPATIAL QUERY	ATTRIBUTE QUERY	QUERY/WINDOW	GENERALIZATION	SCALE CHANGE	COSMETIC ENHANCEMENT	GRAPHIC SUPERIMPOSITION	POLYGON MAPPING	POINT MAPPING	LINE MAPPING	SURFACE MAPPING	ANNOTATION/TEXT	COLLECTION	STORAGE	RETRIEVAL	ENTRY/EDIT	COLLECTION	STORAGE	RETRIEVAL	ANALYSIS	DISPLAY	INDEXING	STORAGE	RETRIEVAL	
AGENCY FUNCTIONS	1	Prepare Base Maps	○	●	●	●	●		●	◐							●	◐		◐				●																								●		●	●		●		●																
	2	Encoding of Physical	○	●	●	●	●		●	●											●			●																								●		●		●			●																
		Plant																																																																			

18 LIST OF PROVINCIAL PERSONNEL INTERVIEWED

MINISTRY OF AGRICULTURE AND FOOD
801 Bay Street
Toronto, Ontario
M7A 2B2

Finance and Policy Division

Crop Insurance and Stabilization Branch Crop Insurance Commission of Ontario	George Jackson, Programs Manager Special Reports Doug Jackson, Field Service Manager (416) 965-7661
Farm Income Stabilization Commission of Ontario	Barbara Hunter, Stabilization Program Administrator (416) 965-1811
Economics Branch Statistics Section	Nick Roller, Senior Statistician Bill McGee, Statistician
Strategic Planning Branch Data Policy Committee	John Galloway, Strategic Planning Branch Henry Ediger, Executive Director, Foodland Preservation and Capital Improvements, and Chairman, Data Policy Committee George Jackson, Programs Manager (416) 965-7661

Foodland Preservation and Improvement Division

Foodland Preservation Branch	Donald Dunn, Director, Foodland Preservation Branch (416) 965-9433
Capital Improvements Branch NORDA Drainage Program	V. Spencer, Director, Capital Improvements Branch Norman MacLeod, Manager, Capital Improvements V. Hammell, Tile Drainage Clerk (416) 965-7661
Agricultural Resource Inventory	George Jackson, Program Manager, Special Projects Vern Spencer, Director, Capital Improvements (416) 965-7661

Quality and Standards Division

Dairy Inspection Branch	Glenn Ward, Manager, Producer Section (416) 965-2411

MINISTRY OF CITIZENSHIP AND CULTURE

77 Bloor Street West
7th Floor
Toronto, Ontario
M7A 2R9

Culture Division

Heritage Branch Archaeology Unit	Donna McNeil, Archaeological Data Co-ordinator (416) 965-4490
Architecture and Planning Unit Building Rehabilitation and Improvement Campaign	Mark Framm, Conservation Officer (416) 965-4964

CHIEF ELECTION OFFICER

70 Lombard Street
Toronto, Ontario
M5C 1M3
(416) 965-6831

Office of the Legislature	Warren Bailie, Chief Election Officer Bob Carter, Director of Operations

MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS

555 Yonge Street
Toronto, Ontario
M7A 2H6

Property Rights Division

Real Property Registration Branch Land Registration Improvement Project (POLARIS)	A. Datlin, Project Leader, Systems and Programming Ray Scott, Project Leader, Mapping Support System (416) 963-0650

Registrar General

Birth, Death and Marriage Certificates	Dale De Marsh, Manager, Registration of Vital Events (416) 965-2274

Residential Tenancy Commission

Rent Review Section	G. L. Gross, Legal Counsel and Secretary to the Board (416) 963-2742

Technical Standards Division

Fuels Safety Branch	E. Grzesik, Chief Engineer O. Alonso, Pipeline Engineer A. Gooch, Technical Co-ordinator, Natural Gas D. Conway, Technical Co-ordinator, Propane (416) 238-1297

MINISTRY OF THE ENVIRONMENT

Environmental Planning Division

Air Resources Branch Air Quality and Meteorology 880 Bay Street 4th Floor Toronto, Ontario M5S 1Z8 (416) 965-0689	L. Shenfeld, Supervisor, Air Quality and Meteorology Simon Wong, Model Project Engineer Peter Schaffer, Programmer
Laboratory Services and Applied Research Water Quality Section P.O. Box 213 Rexdale, Ontario M9W 5L1 (416) 248-3036	Serge Villard, Manager, Laboratory Services Branch
Water Resources Branch 1 St. Clair Avenue West Toronto, Ontario M4V 1P5 (416) 965-6141	

Administration and Data Services Section	Kenneth F. Rego, Supervisor
Hydrology and Monitoring Section Networks Unit	D. J. Vallery, Geologist, Networks J. D. Eddie, Technologist, Surveys Water Networks
Quality Protection Section Industrial Organics Unit	K. P. Suboch, Head of Industrial Organics (416) 965-6954
Water Supply and Pollution Control Section Municipal Sewage Unit 40 St. Clair Avenue West 6th Floor Toronto, Ontario M4V 1M2 965-1655	Emma Dolinar, Management Information Officer

Regional Operations Division

Environmental Approvals and Project Engineering Branch

Administrative Support Section 135 St. Clair Avenue West Toronto, Ontario M4V 1P5 (416) 965-6421	Doras Kemp, Manager of Administrative Support
Project Control Section 40 St. Clair Avenue West 5th Floor Toronto, Ontario M4V 1M2 (416) 965-1371	C. E. Letman, Manager, Project Control A. Henry Talon, Product Data Officer

MINISTRY OF GOVERNMENT SERVICES

Assistant Deputy Minister, Accommodation

Management Systems and Services Section AMIS Operations	R. Rossetto, Manager AMIS Unit Macdonald Block, Room M1-21 Queen's Park Toronto, Ontario M7A 2C1 (416) 965-6745

Property Development Division Accommodation Planning Section	Fred Allen, Manager, Strategic Planning Unit Ferguson Block, 12th Floor Queen's Park Toronto, Ontario M7A 1N3 (416) 965-3800

MINISTRY OF HEALTH

Emergency Health Services Division

Ambulance Services Branch Metropolitan Toronto Ambulance Service	K. J. Kitchen, Area Supervisor J. Bull, Supervisor, Communications (416) 636-6810

Information Systems Division

Management Systems Branch Health Systems Support Section	A. McCoquodale, Health Systems Support Manager (416) 965-0985

MINISTRY OF MUNICIPAL AFFAIRS AND HOUSING

Plans Administration Division

Community Planning Review Branch	Satish Dhar, Senior Planner (416) 965-6418

MINISTRY OF NATURAL RESOURCES

Forest Resources Division

Timber Sales Branch Forest Management Information Section Forest Resource Inventory Unit	Brian Cardwell, Supervisor Whitney Block, Room 3544 Queen's Park Toronto, Ontario M7A 1W3 (416) 965-6914
Forest Management Information Section FORMAGAIN	J. E. Osborn, Supervisor Whitney Block (416) 965-6914 W. E. Jenns, Supervisor FORMAGAIN Macdonald Block, Room M1B-43 (416) 963-0882

Forest Resources Branch **Forest Production and Control Section** **Forest Production Policy Unit** **Silviculture Information and Regeneration Assessment Systems**	M. A. Chaudhry, Assessment Specialist Whitney Block, Room 3651 Queen's Park Toronto, Ontario M7A 1W3 (416) 965-2575

Lands and Waters Group
Whitney Block
Queen's Park
Toronto, Ontario
M7A 1W3

Conservation Authorities and Water Management Branch **Services Section** **Emergency Co-ordination Unit** **Floodplain Mapping System**	Lewis Balogh, Emergency Co-ordinator Whitney Block, Room 5632 (416) 965-6277
Land Management Branch **Eastern Ontario Mining Division** **Mining Recorder Reports**	Raili M. Charnesky, Mining Recorder Eastern Ontario Mining Division (416) 965-1322
Mining Lands Section	J. Smith, Supervisor F. Matthews, Mining Administrator Whitney Block, Room 6404 (416) 965-1380
Public Lands Section **Cottage Lot Records**	J. Cameron, Technician Whitney Block, Room 6520 (416) 965-2743
Interim Property Management Unit	Lloyd Hall, Interim Property Manager (416) 965-2899
Lake Planning Unit	Norm Gordon, Head of Land Management Unit Shirley Lee, Assistant Planner
Titles Section **Acreage Tax Administration Unit**	Gary Sherman, Acting Supervisor (416) 965-1319
Land Records Unit (Domesday Records)	Vic Prasad, Supervisor Whitney Block, Room 6501 (416) 965-1319
Land Use Co-ordination Branch	M. Millar, Supervisor R. Riley, Regional Director (416) 965-2899

Surveys and Mapping Branch Drafting Services Section	David Robeson, Manager Whitney Block, Room 2522 (416) 965-1823
Basic Mapping Section	B. Jackson, Manager, Basic Mapping Whitney Block, Room 2623 (416) 965-1208
Geographical Referencing Section	John Kerr, Manager, Geographical Referencing Section Zul Jiwani, Head Mathematical Adjustments Kevin Kelly, Control Survey Data Analyst (416) 965-4538
Nomenclature Section	M. B. Smart, Manager Whitney Block, Room 2601 (416) 965-6515
Survey Services Section Survey Records Section	D. E. Norris, Manager Whitney Block, Room 6643 (416) 965-2714
Ontario Centre for Remote Sensing (OCRS) 880 Bay Street 3rd Floor Toronto, Ontario M5S 1Z8 (416) 965-8411	Simsek Pala, Chief Scientist
Ontario Land Inventory and Canada Land Inventory	T. J. Ellis, Staff Scientist
Mineral Resources Group	
Mineral Resources Branch Whitney Block Queen's Park Toronto, Ontario M7A 1W3	
Industrial Minerals Section Whitney Block, Room 4646 (416) 965-1172	S. E. Yundt, Supervisor John S. Masham, Aggregate Enforcement Policy Advisor Janice Pelton, Programmer
Metallic Minerals Section Drill Hole Files System Whitney Block, Room 4630 Queen's Park Toronto, Ontario M7A 1W3 (416) 965-1311	James A. Robertson, Policy Advisor

Mineral Statistics Section **Census of Mines, Quarries and Sandpits** Whitney Block, Room 4632 Queen's Park Toronto, Ontario M7A 1W3 (416) 965-0211	Gary Weatherson, Data Systems Co-ordinator, Senior Policy Advisor, and Supervisor
Ontario Geological Survey **Geoservices Section** 77 Grenville Room 804 Toronto, Ontario (416) 965-4641	Henk Groen, Geoscience Data Centre Chief
Ontario Geological Survey **Scientific Review Office** (416) 965-4534	Gertrude M. Scott, Manager, Scientific Review Centre Alaster Currie, Review Geologist
Outdoor Recreation Group	
Fisheries Branch Whitney Block Queen's Park Toronto, Ontario M7A 1W3	
Client Services Section **Resident and Non-Resident Sport Fishermen Surveys**	Nilam Bedi, Economist Whitney Block, Room 2345 (416) 965-7883
Environmental Dynamics Section **Ontario Fisheries Information System**	George Gale, Inventory Data Systems and Laboratory Specialist Whitney Block, Room 4422 (416) 965-7887
Fish Culture Section	Douglas Farquhar, Fish Culture Systems Specialist Renate Butterfield, Contract Biologist Whitney Block, Room 2454 (416) 965-7886
Parks and Recreational Areas Branch **Development Section** **Public Health and Environmental Sanitation Unit**	S. Cowan, Environmental Sanitation Co-ordinator P. Naylor, Development Clerk Whitney Block, Room 3320 (416) 965-2745

Operations Section Recreational Areas Unit Access Points System	Brian C. Huis, Recreation Areas Technician (416) 965-1245
Planning Section	G. D. Driscoll, Management Information Specialist, Research Unit M. D. Garscadden, Senior Planner, Parks and Heritage Resources Unit D. E. Hallman, Senior Planner, Research Unit R. J. Davidson, Earth Science Specialist, Parks and Heritage Resources Unit Whitney Block, Room 3340 (416) 965-3981

Wildlife Branch
Central Wildlife Services Section
Whitney Block
Queen's Park
Toronto, Ontario
M7A 1W3

Fur Management Unit	Milan Novak, Commercial Wildlife Co-ordinator Whitney Block, Room 2423 (416) 965-3345
Information Data Systems Unit	J. M. Barbowski, Information Data Systems Co-ordinator Whitney Block, Room 2325 (416) 965-4521

Wildlife Research Section
Maple, Ontario
LOJ 1E0
(416) 835-2761

Big Game, Predator and Rabies Units **Radio Telemetry System, Snow Station System, Rabies Case Records and ORRAVAX Necropsy Records**	**Dennis Voigt, Research Scientist**
Upland Game and Waterfowl Unit	**H. G. Lumsden, Scientist**

Assistant Deputy Minister of Northern Ontario

Aviation and Fire Management Branch
Ontario Government Building
55 Church Streeet
Sault Ste. Marie, Ontario
P6A 5L8
(416) 942-1800

Fire Control Unit	R. J. Drysdale, Provincial Forest Fire Research and Development Supervisor T. Woods, Operations Office Fire Management
Telecommunications Section	J. Scotland, Supervisor M. Franchuk J. Tidman
Area Planning Section	Dick Brady
Timmins Regional Office Lands Administration Branch Public Lands, Mining Lands, and Land Use Planning Sections	C. D. Harrison, Regional Lands Administrator 60 Wilson Avenue Timmins, Ontario P4N 2S7 (705) 267-1401 B. Good, Supervisor, Titles Section Whitney Block Queen's Park Toronto, Ontario

MINISTRY OF REVENUE

Assessment Services Division

Data Services and Development Branch 33 King Street West Oshawa, Ontario L1N 8H5	W. J. Baxter, Director, Data Services and Development Branch L. Stadelman, Quality Control Officer (416) 433-5677

MINISTRY OF TOURISM AND RECREATION

Recreation Division

Sports and Fitness Branch Coaching Program	Jan Godfrey, Assistant Coaching Co-ordinator 77 Bloor Street West 8th Floor Toronto, Ontario M7A 2R9 (416) 965-6546

MINISTRY OF TRANSPORTATION AND COMMUNICATIONS

Highway Engineering Division
1201 Wilson Avenue
Downsview, Ontario
M3M 1J8

Surveys and Plans Branch	Brian Turner, Co-ordinator, CADD Systems (416) 248-3249
Cartography Section	Tim P. Wood, Head Cartography Section (416) 248-3248

Office of the Assistant Deputy Minister, Engineering and Construction

Property Office Policy and Land Management Section 3501 Dufferin Street, 5th Floor Downsview, Ontario M3K 1N6	Fred Merrick, Senior Policy and Land Management Officer (416) 248-3213

Office of the Assistant Deputy Minister, Provincial/Municipal Transportation

Policy Planning Branch Transportation Demand Forecasting Office Land Use Analysis Group 1201 Wilson Avenue 2nd Floor, West Tower Downsview, Ontario M3M 1J8	Pentti Suokas, Supervisor, Land Use Analysis (416) 248-3795

Office of the Managing Director

GO ALRT Program, Oakville and Pickering Project 3625 Dufferin Street Downsview, Ontario M3K 1Z2	Frank Norman, Project Director (416) 630-7990

Office of the Assistant Deputy Minister, Finance and Administration

Capital Projects Branch 1201 Wilson Avenue 4th Floor, West Tower Downsview, Ontario M3M 1J8 (416) 248-3066	Ross Critelli, Program Information Planner, Program Information Group Alex Woda, Programmer Mavis Edwards, Senior Referencing System Analyst

MINISTRY OF THE SOLICITOR GENERAL
ONTARIO PROVINCIAL POLICE

90 Harbour Street
Toronto, Ontario
M7A 2S1

Planning and Technology Division **Computer Services**	George R. Comrie, Computer Services Bob Patterson, Assistant Director Sandor Koltai, Systems Co-ordinator (416) 965-8127

BELL CANADA

Outside Plant Division 393 University Avenue 3rd Floor Toronto, Ontario M5G 1W9 (416) 491-1720	Aleks Kleniewski, Section Manager, Plant Location, Records Mechanization Vlad Ruzicka, Systems Analyst, Support Services Manchiu Wong, Section Manager, Office Systems

ONTARIO HYDRO

Design and Development Division

Environmental Studies and Assessments Department **Environmental Planning and Assessments Section**	Jon Gee, Environmental Studies Scientist 700 University Avenue 8th Floor Toronto, Ontario M5G 1X6

Real Estate Services Division

Real Estate Management Programs
Department
Planning and Development Programs

Michael Goldstein, Planning
Studies Supervisor
595 Bay Street
2nd Floor
Toronto, Ontario
M5G 2C3
(416) 592-3246

Route and Site Selection Division

Land Use and Environmental Planning
Department
CARSS (Computer Assisted Route and
Site Selection)
700 University Avenue
Toronto, Ontario
M5G 1X6
(416) 592-7897

Leigh Harmeson, Supervisor Planner
Larry Harder, Planner

UNION GAS

K. A. Burk, Superintendent, Mapping
Services
W. R. Forret, Manager, Operations
Development
E. Drennan, Distribution
Maintenance Supervisor

19 SUMMARY ANALYSIS AND CONCLUSIONS

OBSERVATIONS REGARDING DIGITAL MAPPING NEEDS

Some recurring problems and concerns were heard during the course of the Provincial User Needs Study interviews. Many agencies indicated a lack of continuous and consistent coverage of base maps for use in carrying out provincial responsibilities. This lack of adequate base mapping coverage, in conjunction with divergent georeferencing schemes for existing data inventories, was found to result in an inability to correlate data from various sources and of various kinds. As a result, many of these organizations find it difficult to make visual and topological correlations of certain existing and available data.

In many agencies, existing procedures, formats and mechanisms for the storage of data inventories and data bases seem to preclude or limit the capability to share and access availabe data from outside a particular agency. Numerous organizations voiced the desire to overcome these existing barriers to data access and transfer.

Many representatives of the agencies interviewed also articulated the need for supplementary tools and techniques for data analysis, manipulation, modelling and display. In their current modes of operation, limitations to both efficient and extensive data handling were recognized.

The creation and availability of several digital mapping products would respond to these identified provincial user needs. In particular, the products for which clear needs were indicated inlcude: digital topographic maps, digital terrain models, digital parcel maps and digital street networks.

NEEDS FOR DIGITAL TOPOGRAPHIC MAPS

Digital topographic maps are used in resource, land use and land planning. They are more versatile than manual topographic map products because scales may be readily changed and line weights maintained. Digital topographic maps may be displayed on video graphic screens for ease of update, manipulation and windowing. Features for mapping may be selected by the user, and mapped rapidly. Also, selected data may be transmitted by telephone to remote regional or district offices.

The Ministry of Agriculture and Food indicated a need for digital topographic maps, particularly in its drainage programs.

A digital Ontario map base will provide a framework for the Ministry of Consumer and Commercial Relations POLARIS products. MCCR plans to automate the land registration records in Ontario, including maps which display land ownership parcels.

Digital topographic maps would be desirable to use in a variety of applications by the Ministry of the Environment. The plotting of point sources of air pollution and the correlation of air quality with emissions and landforms would be useful to the Air Resources Branch. The digital topographic base would also be useful as a background for plotting water quality sample location data, which could then be used to indicate the extent and sources of pollution, as well as the direction of spread. A consistent digital base is also desired for plotting water well locations and municipal sewage data.

The Ministry of Municipal Affairs and Housing desires digital topographic maps as a base with consistent scale and content for overlaying parcel boundaries and other planning information.

The Ministry of Natural Resources has an extensive array of applications for which digital topographic maps are needed. These maps would be used in the areas of Aviation and Fire Management, Forest Resources, Conservation Authorities, Public Lands, Outdoor Recreation, the Ontario Land Inventory and Mineral Resources.

The Aviation and Fire Management Centre requires these maps, in conjunction with digital terrain models, to assist in fighting forest fires and siting radio transmitters. With a digital topographic base, the Centre could simulate and display a fire model including various natural parameters such as wind direction and velocity, slope, soil moisture content and fuel type.

In Forest Resources, forest stand boundaries are currently digitized in order to maintain the forest resource inventory and manage the forests more effectively. In the absence of a digital map base, Forest Resources staff digitize base map features, such as lakes, rivers and roads. An accessible digital topographic data base would eliminate the need to digitize the base map features, and would ensure that the features on their maps are identical to the Ontario Basic Map base. Once more thematic users employ this digital base, opportunities for the exchange, overlay, comparison and correlation of such data will be enhanced.

An accurate topographic base is required by Conservation Authorities for the superimposition and manipulation of flood plain data. Using this base in conjunction with digital terrain models, drainage basin analysis and flood prediction models could be expedited.

In Public Lands, administrators use township plans to display lands alienated from the Crown. A new series of these plans, called "G" plans, are being produced using Ontario Basic Maps as a source for features such as lakes, roads, and the township survey fabric. The G-plans could be automatically derived if a digital topographic base were available, and lands alienated by the Crown could then be added interactively, using a graphics terminal. These plans could also be updated and edited in an efficient manner as needed. Mining claims recorded in a regional office could be added to the files immediately by the local Mining Recorder, who would access the G-plan digital files by telephone. This could eliminate current delays in updating recorded claims on the G-plans. The Lake Planning Unit would also find the digital topographic base useful as a common base for overlay and analysis purposes.

The Outdoor Recreation Group would find digital base maps useful for recording the positions of rabies incidence, which would then be used in monitoring the extent and direction of spread of the disease. This capability could assist managers in more quickly locating animals which spread the disease. The availability of digital base maps would also be desirable to the

Outdoor Recreation Group for recording and manipulating data used in Fur Management, Radio Telemetry, and other units.

Ontario Land Inventory data is currently stored on hard copy maps which are not readily accessible or usable by a range of otherwise potential users. If this data were digitized and integrated with a digital topographic base, it would be used by many disciplines for a variety of applications, such as determining the number of cottage sites a given area will support, or to provide the number of forest types for silviculture and other such studies.

The Ministry of Transportation and Communications, for its GO ALRT program, has a need for digital map base coverage at a variety of scales. Using these maps, a broad range of geometric analyses as well as digital terrain models will be employed.

Utility companies, including Bell Canada and Union Gas, would also use digital topographic maps. In conjunction with digital parcel data, companies could use these maps to overlay plant information and maintian up-to-date records.

NEEDS FOR DIGITAL PARCEL MAPS

Digital parcel maps are desirable for numerous applications, including the display of parcel ownership boundaries, zoning and other administrative boundaries. These boundaries may then be associated with the attributes of the parcels and other spatial units to produce maps for a variety of provincial uses.

The Ministry of Agriculture and Food would like to use digital parcel overlays, in conjunction with topographic maps, to relate crop and land use information with parcels and farms. The Ministry could also produce information and statistics which are relevant to its Crop Insurance and Farm Income Stabilization programs.

The Ministry of Consumer and Commercial Relations plans to produce digital parcel maps using POLARIS, and demonstrate their utility to municipalities. The existence of digital parcel maps in the Land Registry System will expedite access to registered plans, and help to preserve the original plans, because manual handling will be reduced. The availability of parcel map data in digital form will also introduce a means for remote access to these records via graphic terminals.

The Ministry of Revenue is one of the largest potential users of digital parcel maps. It is interested in acquiring these maps in order to upgrade its assessment map base and to provide video display of land ownership parcels and the associated attributes which affect assessment, such as lot dimensions, and the buildings contained within a specific area.

The Ontario Provincial Police desires a common digital map base against which they may plot the locations and times of crimes and traffic accidents. This would assist in the efficient allocation of personnel to crimes and accidents. To provide a more accurate positional base, the extension of geocodes to the parcel level is desired. The Police would like the ability to plot criminal haunts on a digital base to assist in tracking criminals.

NEEDS FOR DIGITAL STREET NETWORKS

The digital street network is needed to support several vital provincial functions and services. It provides a base for referencing accident and other incidents, and may also serve as a data base inventory function for street hardware, such as traffic signs, street and traffic lights, and so forth. If structured topologically and linked to the Statistics Canada and other files, a digital street network would provide opportunities for a range of other applications as well, such as the simulation of traffic and water flows, and the selection of optimal paths and routes.

Some key potential users of digital street network files include: the Office of the Chief Election Officer for producing electoral district maps, polling division boundaries, and election statistics; and the Ministry of Health for ambulance dispatch, optimal ambulance route selection and related activities.

NEEDS FOR DIGITAL TERRAIN MODELS

Digital terrain models are desirable to provide three dimensional perspective of the earth's surface. These models are used primarily in generating contours, but are also used in watershed, drainage basin and flood risk studies and analyses. They may also be integrated with various computer simulation models to provide slope, aspect, and sun intensity information. Other products include cross-sections, profiles and spot heights.

The User Needs Study identified a range of desires and potential uses of digital terrain models. Some of the applications for which they are desired include: enhancing current modelling capabilities for contouring, slope/aspect study, cross-sectioning, viewshed and watershed studies by Ontario Hydro; specifying contours and watershed studies by Ontario Hydro; specifying contours and watersheds for AGF Foodland Preservation Branch; performing runoff and watershed analysis for AGF industrial monitoring tasks; producing drainage basin, flood prediction, contouring and watershed analysis studies for MNR Conservation Authorities; producing contours for MNR drafting services and MTC surveys and planning; and supplying a variety of models for MNR fire management and control.

POTENTIAL PROVINCIAL USE OF GEOGRAPHIC DATA MANAGEMENT PROCEDURES

Discussions with provincial agency representatives also resulted in the identification of various types of geographic data management procedures which are currently or potentially useful in fulfilling provincial functions and responsiblities. The range of procedures is extensive, as shown and described in the Appendix. Some general conclusions may be drawn from the interviews regarding the types of procedures which would be prevalently used.

If geographic information systems and associated capabilities were available, most provincial agencies would take advantage of the ability to perform spatial and attribute queries on their data inventories. This capability provides for efficient retrieval of desired spatially related data for staff interview and analysis, response to public enquiries, and public information dissemination.

A predominant number of the provincial agencies which create, maintain or use spatially related information require a range of geometric analysis capabilities to manipulate their data in an effective manner.

Polygon overlay, for instance, is a broadly desired technique for correlating selected data in given areas, or for updating given sets of attributes for those areas. Polygon overlays, as well as the associated technique of point in polygon, are desired for use by the following agencies, for example:

- o AGF to correlate current crop yields with historic land uses,
- o MCC Archaeology Unit to overlay thematic data to identify potential historic sites,
- o MOE Air Resources Branch to correlate air quality and emissions data with landforms,
- o MGS Accommodation Planning Section to superimpose government facilities, land uses and zoning, and
- o MNR Conservation Authorities to prepare cartographic displays of flood plain and other natural resource thematic data.

Other geometric analysis techniques, such as proximal and contiguity analyses, buffering and area/perimeter calculations, are desired for determining and/or avoiding the effects of a given activity or event on others in proximity. For example, such analyses are required or desired by: MOE in monitoring the effects of air and water pollution on given locales; and by Metro Toronto Ambulance Service to ascertain the service area of a given ambulance station.

Techniques such as polygon dissolve, aggregation/districting and so forth are used to generalize detailed information where adjacent polygons share common attributes, and a more simplified reporting format is desired. Provincial agencies using these types of techniques could include, for example, the Chief Election Officer, the Statistics and Crop Sections of AGF, etc.

Cartographic display and presentation techniques were broadly desired as means for more effectively conveying spatial information on natural resources, land uses, public and utility services, statistical, demographic and assessment data. Polygon, point and line mapping with text annotation are procedures which were prominently identified.

In addition, agencies with significant reporting or public information demands identify a need for business graphics. Some of these agencies would include: the AGF Statistics Section, the MNR Public Health and Sanitation Unit, the Ontario Provincial Police and the Metro Toronto Ambulance Service.

GENERAL COMMENT

A number of agencies involved in the Provincial User Needs Study indicated desires for digital mapping, geometric analysis, or other capabilities for geographic data management which could reasonably be viewed as unjustified on the basis of individual agency requirements alone. However, if these individual agency needs and desires are considered in the aggregate, a rational justification seems to develop for access by such agencies to a "global" system, if one were to become available.

During the course of this study, it also became clear that the availability of digital cartographic facilities and capabilities would likely engender growing and evolving needs and demands on the part of participating agencies and organizations. Therefore, while this study aims to provide a foundation and conceptual springboard for the development of land-related information tools and techniques, it is recognized that the uses of such tools, and the demands of their users, will comprise an everchanging and evolving process.